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Noviciæ Indicæ XV. *Some additional Leguminosæ.*—By D. PRAIN.

[Read February 3rd, 1897.]

The present paper contains descriptions of species that are new to India in the sense that they are not included in the account of this Order prepared in 1876 by Mr. J. G. Baker, F.R.S., the distinguished Keeper of the Herbarium, Royal Gardens, Kew, for Sir Joseph Hooker's *Flora of British India*, Vol. II. Some of the species are new to science or at all events are not to be traced in any of the works in the library of the Calcutta garden and are not provided with names either in the Calcutta Herbarium or in that at Kew. Others are species already described elsewhere but not included in the *Flora of British India* because they had not been reported from within the limits of the Indian Empire up to the time when Mr. Baker's account of the *Leguminosæ* was being prepared. And in order that these contributions may preserve the character of being in substance, as well as in form, supplementary to the *Flora*, definitions of species of both kinds have been given in the hope that they may prove helpful to members of our Society who use the *Flora* itself in the field.

In the *Flora of British India* Mr. Baker has indicated points that were doubtful to him and has urged the attention of Indian botanists to these points, in the hope that the difficulties may be removed by the supply of more adequate material. Some of these difficulties it has been possible from the possession of more recent and more adequate suites of specimens to satisfactorily settle; naturally, too, the more ample material at our disposal now, has indicated other difficulties where

formerly all seemed clear. And in this paper allusion is made to both these kinds of difficulties, wherever they have been detected.

From the present review the writer regrets to have had to exclude the large genus *Astragalus*; many species belonging to that genus have been added to the Indian Flora owing to the extension of the Indian Empire during recent years along its north-western frontier. It is his hope however to present to the Society at another time a separate review of the Indian species of *Astragalus* and of the closely allied genus *Oxytropis*, which has also for the present been omitted from consideration.

1. PIPTANTHUS D. DON.

1. PIPTANTHUS NEPALENSIS D. Don.

Add to localities of *F. B. I.*:—ASSAM; Khasia; at Lailankote, etc., *C. B. Clarke!* *G. Gammie!* Jaintea; *Prain!* Manipur, on a hill north-east of Chingsow, *Watt!* BURMA; Chin Hills, *C. R. Dun!*

2. THERMOPSIS R. BR.

3. THERMOPSIS LANCEOLATA *R. Br.* in *Ait. Hort. Kew.* ed. ii. iii. 3; finely downy, leaflets ovate-oblong, corolla yellow, pod narrowly oblong-linear. *DC. Prodr.* ii. 99; *Ledeb. Flor. Alt.* ii. 112; *Flor. Ross.* i. 510. *Sophora lupinoides Linn. Sp. Pl.* 374.

EASTERN TEMPERATE HIMALAYA; Phari; *King's Collectors!* *DISTRIB.* Siberia, China.

General habit of the other Himalayan species. *Rootstock* woody. *Leaves* petioled, petioles short $\frac{1}{8}$ – $\frac{1}{4}$ in., leaflets glabrous above, downy below, $1\frac{1}{2}$ in. long, $\frac{1}{3}$ in across, apex obtuse base cuneate. *Stipules* like leaflets and almost as large. *Flowers* verticillate 3-nate, stalks $\frac{1}{8}$ – $\frac{1}{4}$ in. *Calyx* finely downy, the three lower teeth hardly as long as tube. *Pod* distinctly stalked, 6–8-seeded, thin, flat, $2\frac{1}{2}$ in. long, $\frac{1}{3}$ in. across from suture to suture.

An extremely interesting addition to the Himalayan Flora. In general appearance it much resembles the other species but is easily distinguished by its long narrow pods and its petioled leaves.

4. ARGYROLOBIUM ECKL. & ZEYH.

2. ARGYROLOBIUM ROSEUM *Jaub. & Spach.*

This species is said in *F. B. I.* to be 'nearly or quite glabrous' with leaflets truncate or emarginate and with corollas yellow tinged with red. The result has been that this species has been frequently sent to Calcutta, after comparison with the *F. B. I.* description, with the suggestion that it is either a new species or the one next to be described. Sometimes, but very rarely, it is nearly glabrous and occasionally all the leaflets are truncate or emarginate: much more usually, however, the leaflets are mucronate. The flowers are "rose" (*Jacquemont*) or "purplish"

(*A. O. Hume*); "there is no trace of yellow" (*Collett*); the colour of the next species has been attributed in the *F. B. I.* to this one.

3. ARGYROLOBIMUM TRIGONELLOIDES *Jaub. & Spach.* in *Ann. Sc. Nat.* ser. ii. xix. 50; end leaflet obovate-cuneate, obtuse, emarginate, truncate or mucronulate, calyx-teeth lanceolate all subequal, upper lip 2-partite. *Jaub. & Spach. Ic.* t. 60; *Boiss. Flor. Orient.* ii. 33.

BRITISH BELUCHISTAN; Nal, *Duke!* DISTRIB. Persia.

Hardly distinguishable in the herbarium from *A. roseum* of which it has the habit and foliage. The pods however are shorter, flatter, and few seeded; $\frac{1}{2}$ in. long $\frac{1}{10}$ in. broad 3-6-seeded, strigose; the flowers are yellow, with a tinge of purple, and the upper lip of the calyx in place of being only 2-fid as in *A. roseum* is 2-partite almost to the base.

8. CROTALARIA LINN.

6. CROTALARIA TRICHOPHORA *Benth.*

Add to localities of *F. B. I.*:—BEHAR; *Kurz!*

8. CROTALARIA VESTITA *Bak.*

This species is common on the Western Ghauts, as at Khandalla and Mahableshtar.

9. CROTALARIA PROSTRATA *Roxb.*

Add to localities of *F. B. I.*:—UPPER BURMA; Sandow Hill, *Prager!*

10. CROTALARIA HUMIFUSA *Grah.*

Add to localities of *F. B. I.*:—NAGA HILLS; Kohima, *Clarke!* UPPER BURMA; Nat-toung Mts. *Cross!*

11. CROTALARIA FERRUGINEA *Grah.*

Add to distrib.:—Yunnan (*Anderson!*)

12. CROTALARIA ACICULARIS *Ham.*

Add to localities of *F. B. I.*:—MADRAS PRESY.; Ganjam, frequent, *Gamble!* Anamallays, *Beddome!*

14. CROTALARIA HIRSUTA *Willd.*

Add to localities of *F. B. I.*:—BURMA; South Shan States, *King's Collectors!*

16. CROTALARIA MULTIFLORA *Bth.*

Add to localities of *F. B. I.*:—Anamallay Mts., *Beddome!*

17. CROTALARIA ALATA *Ham.*

Add to localities of *F. B. I.*:—MALAY PENINSULA; Singapore, *Hullett!* *Ridley!*

18b. CROTALARIA COLLETTII *Prain*; diffuse, stipular wing broad, leaves small orbicular obtuse coriaceous, peduncle elongated leafy, pod distinctly stalked. *C. alata* *Coll. & Hemsl. Journ. Linn. Soc.* xxxviii. 37 (1890) *not of Ham.*

UPPER BURMA; Popah Hill, 5000 feet, *Collett!*

A spreading shrub with stems 6-12 in. long densely grey velvety. *Leaves* sessile orbicular $\frac{1}{2}$ in. across densely velvety especially beneath, stipules forming a broad wing for the whole extent of an internode, their points lanceolate-deltoid. *Racemes* 2-3-fl. and flowers often solitary, bracts small persistent ovate-acuminate. *Calyx* $\frac{1}{2}$ in. densely silky, tube campanulate. *Pod* oblong 1 in. long, glabrous, its stalk $\frac{1}{4}$ in., 20-30-seeded.

This plant, which has exactly the facies of *Crotalaria scabrella* W. & A. differs from that Southern Indian plant in having peduncles and stipular wings exactly like those of *C. alata*. On this account Sir H. Collett and Mr. Hemsley unite it with *C. alata*, which they can find no character to distinguish as a species from *C. rubiginosa* Willd. the plant to which Mr. Baker has referred *C. scabrella*. With this view the author cannot altogether agree though it is true that if we accept the treatment of the remaining forms in the *Flora of British India* it is logically necessary. After an examination, however, of 20 specimens, (seven gatherings), of *Crotalaria rubiginosa* and of 34 specimens, (ten gatherings), of *Crotalaria scabrella* the writer is convinced that the union of the two as varieties of one species, except on the comprehensive principle advocated by Collett and Hemsley which would recognise but one species with wing-like stipules, cannot be sustained. There are no intermediates between the two plants which, though not dissimilar in size, differ in habit, tomentum, shape and venation of leaves, size and shape of stipules, and above all in size and shape of pods—those of *C. rubiginosa* being $\frac{1}{3}$ shorter and nearly $\frac{1}{2}$ narrower than those of *C. scabrella* and being quite sessile while those of *C. scabrella* are stalked. As this character alone will quite sufficiently enable members to distinguish the two species in the field a detailed description of *C. scabrella* is not here given. It is otherwise however with *C. Wightiana*, also reduced by Mr. Baker to *C. rubiginosa*, which differs so widely that it is essential, in restoring it to the specific rank that it deserves, to provide a description.

18c. *CROTALARIA WIGHTIANA* *Grah.* in *Wall. Cat. n.* 5358; tall erect branched, stipular wing broad triangular-ovate much expanded at apex; leaves thin elliptic-obovate obtuse mucronate, peduncles usually very long, pod long-stalked. *W. & A. Prodr. i.* 181. *C. rubiginosa* var. *Wightiana* *Bak.* in *Flor. Brit. Ind. ii.* 69.

SOUTH INDIA; Dindygul Hills, *Wight* (*Cat. n.* 693! *Wall. Cat. n.* 5358! *Kew Dist. n.* 587!) Coonoor, 6000 feet elev., *Gamble n.* 13256! CEYLON; Kandy, *Thwaites!* *Watson!* *Pedrotalla, T. Thomson!*

A shrub, 3-4 feet high, fastigiately branched. *Stem* and leaves beneath closely adpressed rusty-tomentose. *Leaves* very short-petioled 2 in. long, 1.75 in. across, stipule $\frac{1}{2}$ in. wide or more at top forming a wing for whole length of internode. *Racemes* 2-5-fl., bracts large persistent ovate-acute. *Calyx* $\frac{3}{8}$ in. densely silky, tube short campanulate bracteoles inserted above the base, teeth lanceolate. *Corolla* pale-yellow slightly exserted, standard 1 in. long. *Pod* oblong, glabrous 2 in. long (including stalk $\frac{1}{4}$ in.) $\frac{5}{8}$ in. diam., 30-40-seeded.

A very distinct species.

22. *CROTALARIA TRIQUETRA* *Dalz.*

Add to localities of *F. B. L.*:—RAJPUTANA; Mt. Abu, common, *King!*

23. *CROTALARIA ALBIDA* Heyne.

Add to localities of *F. B. I.*:—MALAY PENINSULA; Selangor, *Ridley*!

Also add the following variety:—

VAR. *inopinata*; leaves rigid linear acute densely silky beneath, calyx densely silky. *C. inopinata* Prain MSS.

SHAN HILLS; Yindaw, *King's Collector*!

This plant has exactly the calyx-teeth and precisely the pod of *C. albida* of which it moreover has quite the habit. The foliage and tomentum are however very dissimilar. The corollas on our specimens are not in a fit state for examination, and it seems better to place the plant for the time being under *C. albida*, though it is more likely that it will be found specifically distinct.

24. *CROTALARIA NANA* Burm.

VAR. *typica*; leaves oblong, broader upwards, obtuse; flowers few on lateral pedicels.

VAR. *umbellata*; leaves oblong, acute; flowers many in terminal umbels. *C. umbellata* Wight in Wall. Cat. n. 5383.

WEST and SOUTH INDIA; Dindygul Hills, *Wight*! Nediwattam, *Gamble*! Canara, *Tulbot*! Mahableshwar, *Cooke*!

A very distinct plant perhaps deserving the specific rank claimed for it by Wight.

VAR. *patula* Baker. *C. patula* Griseb. in Wall. Cat. 5371.

Has also been collected, in a 'wild' condition, in Hort. Bot. Calcutta, doubtless having been introduced accidentally from Burma. Probably also quite a distinct species.

27. *CROTALARIA OCCULTA* Griseb.

Add to synonyms:—*C. Stacyana* Wall. in Trans. Med. Phys. Soc. Calcutta vii. 228 (1830).

Add to localities:—NAGA HILLS; Kohima, common, *Prain*!

28. *CROTALARIA CALYCINA* Schrank.

Add to localities of *F. B. I.*:—CHITTAGONG, UPPER BURMA and SHAN HILLS; common.

29. *CROTALARIA SESSILIFLORA* Linn.

Add to localities of *F. B. I.*:—NICOBARS; Kamorta, *Kurz*! (*C. calycina* Kurz, Journ. As. Soc. Beng. xlv. pt. 2. 147. not of Schrank). Add to distrib.:—Java.

29b. *CROTALARIA BURMANICA* Coll. & Hemsl. Journ. Linn. Soc. xxviii. 38; annual or perennial, laxly silky with long hairs; leaves narrowly oblong-lanceolate or the uppermost almost linear; flowers in elongated terminal racemes, with a number of empty tracts disposed along the stem between highest leaf and lowest flower, calyx middle-sized laxly clothed with spreading silky hairs, teeth oblong two upper rather broader; pod unknown.

UPPER BURMA; Shan Hills, at Pwehla, 4000 feet elev., *Collett*!

Stems over 2 feet high apparently simple. *Leaves* herbaceous, shortly petioled 1-1½ in. long, acute or sub-acute hirsute on both faces but especially beneath; stipules minute subulate. *Racemes* 10-15-flid. about 3 in. long, separated by an interval of equal length bearing only barren bracts from the leafy stem, bracts long setaceous persistent. *Calyx* ½ in. long, tube short campanulate. *Corolla* ⅔ in. long. *Ovary* sessile oblong glabrous many-ovuled.

That this species is nearly related to *C. sessiliflora*, as remarked by Genl. Collett and Mr. Hemsley, is evident; it however differs very markedly in having the upper surface of its leaves hirsute, and in having a space with only barren bracts intervening between leaves and flowers. In some respects it is allied to *C. chinensis* but differs in having many-flid. elongated racemes and in being unbranched. Till, however, it is known whether its pod is included or exserted its exact position cannot be determined.

30. *CROTALARIA CHINENSIS* Linn.

Add to localities of *F. B. I.*:—MALAY PENINSULA; Perak, Wray!

33. *CROTALARIA CAPITATA* Grh.

Add to localities of *F. B. I.*:—MANIPUR; Chingsow, Watt! UPPER BURMA; Maymyo, King's Collector! Saiktha, Prazer! South Shan Hills, King's Collectors!

34b. *CROTALARIA PERPUSILLA* Coll. & Hemsl. Journ. Linn. Soc. xxviii. 37; diffuse laxly silky, stems and branches prostrate slender, leafy; leaves very small ovate-rotund, flowers few in lax terminal heads, calyx small densely villous, teeth all lanceolate the two upper rather the longer and wider, pod oblong (immature) hardly exserted.

UPPER BURMA; Shan Hills at Koni, 4000 feet elev., Collett!

A slender procumbent branched annual or perennial, branches 6 in. long or less, densely clothed with adpressed brownish hairs. *Leaves* short petioled rather close-set thinly herbaceous, ½ in. long ¼ in. wide, numerous, clothed on both surfaces with long spreading white hairs and minutely punctate; stipules 0. *Racemes* sub-capitate, 2-5-flid., flowers shortly pedicelled; bracts and bracteoles lanceolate persistent. *Calyx* ⅓ in. tube campanulate the two upper teeth sub-obtuse. *Corolla* ½ in. long, purple, slightly exserted. *Pod* sessile glabrous, hardly exserted (unripe), few-seeded.

Associated by Sir H. Collett and Mr. Hemsley with *C. pusilla* and *C. hirta*; appears to the writer to be most nearly related to *C. priestleyoides*.

36. *CROTALARIA NERIIFOLIA* Wall.

Add to description of *F. B. I.*:—

Pod 1¾-2¼ in. long, narrowly oblong, thick-walled, glabrous, gynophore ⅓ in.

40. *CROTALARIA ASSAMICA* Benth.

Add to localities of *F. B. I.*:—UPPER BURMA; Poneshee, Anderson! Chin Hills, King's Collector! Shan States, Manders! King's Collectors!

67b. *CROTALARIA UNCINELLA* Lamk., *Encyc. Meth.*, ii. 200 (1790); shrubby, branches long, woody, spreading, slender, flexuous, slightly hirsute as are the leaflets beneath, leaflets rather large elliptic-obtuse entire; racemes many-flowered, corolla twice as long as calyx. Lamk.

Ill. t. 617 f. 2. C. elliptica Roxb. *Hort. Beng.* 54; *Flor. Ind.* iii. 279; *Benth. in Hook. Lond. Journ.* ii. 580; *Flor. Hong-Kong.* 75; *Forbes & Hemsl. Ind. Sinens.* i. 151. *C. Vachellii* Hook. & Arn. *Bot. Beechy Voy.* 180; *Walp. Rep.* i. 588.

MALAY PENINSULA; Pahang, *Ridley!* Malacca, *Derry!* *Goodenough!*

An almost stemless undershrub with several almost procumbent spreading branches, 1–2 feet long. *Leaflets* glabrous above, sub-equal or often the terminal rather larger than the other two, 1–1½ in. long, ½–¾ in. broad; petioles about 1 in.; stipules small acute rigid recurved glabrous above, hirsute beneath. *Racemes* lateral and terminal, 2 in. long, 20–25-fl., flowers close-set, bracts small recurved ovate-acuminate. *Calyx* hirsute, teeth lanceolate ¼ in. long. *Corolla* ¼ in. yellow, far exserted, glabrous. *Pod* ¼ in., style sharply hooked, closely adpressed-pubescent, 2-seeded.

First described, from communicated specimens, by Lamarec as a native of Mauritius; again and independently, from introduced specimens, by Roxburgh, as a native of China; refused a place in the Indian Flora by Wight and Arnott and by Baker; now, having been sent from the Malay Peninsula, requiring to be formally added to the Indian list.

70. *CROTALARIA INCANA* Linn.

No doubt naturalized only; to the localities of *F. B. I.* must now be added Chittagong, *King's Collectors!* and Penang, *Curtis!*

73. *CROTALARIA SALTIANA* Andr. *Bot. Rep.* t. 648 (1811).

This name is given as a synonym in *F. B. I.* It is however older than the name *C. striata* DC., which is more usually employed; having been adopted in the Kew Index it is necessary to use the name *C. Saltiana* in the *F. B. I.* also.

At the same time it has to be pointed out that some of the synonyms of the *F. B. I.* do not belong here. *Crotalaria latifolia* Roxb. ex Wight and Arnott, *Prodr.* i. 180, of which an authentic specimen exists in Herb. Calcutta, is not the same as *C. Saltiana* Andr. (*C. striata* DC.) It is however, the same as *C. Brownei* Bertero in DC. *Prodr.* ii. 130. But unfortunately, it is also the same as *C. lanceolata* Roxb. *Hort. Beng.* 54 and as that is the older name doubtless some bibliographers will say that it must be employed to designate the plant. But as this would involve the further displacement of Meyer's *C. lanceolata*, a name given with good reason to a South African species, it seems more in accordance with common sense to retain for the plant in question the name given to it by Bertero. Though named first in the Calcutta Garden the plant is a native of the West Indies and might therefore be left unnoticed, especially as it is no longer in cultivation in the Calcutta Garden, but for the fact that it turns out to have escaped, and become apparently as thoroughly naturalized as *C. incana*, in Chittagong.

73b. *CROTALARIA BROWNEI* Bertero, DC. *Prodr.* ii. 130; shrubby, faintly silky, leaflets large oblong acute, racemes terminal and lateral elongated, bracts minute setaceous, corolla much exserted, pod sessile glabrous cylindric. *C. lanceolata* Roxb. *Hort. Beng.* 54 (nomen prius) not of Mey.; W. & A. *Prodr.* i. 180. *C. latifolia* Roxb. ex Wall. MSS. in *Hort. Calc.*; W. & A. *Prodr.* i. 180.

CHITTAGONG; naturalized, *King's Collector!* Native of West Indies.

An erect shrub 3-6 feet high with robust sulcate stem and branches. *Stipules* minute setaceous, deciduous, petiole 2 in., leaflets 3-5 in. long, narrowed at both ends, glabrous above, obscurely silky below. *Racemes* 20-30-fl., 4-6 in. long, flowers close-set, much like those of *C. Saltiana*; pods also similar but somewhat more turgid and without appreciable stalk.

Exceedingly closely related to the Indian and African *C. Saltiana* but easily distinguished by its much shorter racemes with closely packed flowers and by its totally different foliage. The leaves of this species are exactly like those of *C. bracteata*, for which species, in the absence of fruits, this is apt to be mistaken. After an examination of 75 specimens of 29 different gatherings of the common *C. Saltiana* the writer finds that from such various localities as Sikkim, Western India, Ceylon, Bengal, Assam, Burma, Siam, Perak, Penang, Malacca, Singapore and Java, the species shows no tendency to vary; it *never* has any but obtuse leaflets and in no instance is even the larger terminal leaflet more than $2\frac{1}{2}$ in. long.

75. *CROTALARIA QUINQUEFOLIA* Linn.

Add to localities of *F. B. I.*:—MALAY PENINSULA; Kedah, *Kunstler*! Singapore, *Hullett*!

10. *TRIFOLIUM* LINN.

1*. *TRIFOLIUM DUBIUM* Sibth. *Fl. Oxon.* 231; trailing, peduncles very slender elongated naked, flowers yellow, very small. *T. minus* *Relhan*, *Fl. Cantab.* ed. 2. 290; *Smith*, *Engl. Flor.* iii. 310. *T. filiforme* *Smith*, *Flor. Brit.* ii. 792 *via* Linn.

HIMALAYA; Simla, *Gamble*! *Collett*! Darjeeling; Jallapahar, *King*! NILGIRIS; Ootacamund, *Schmidt*! *Wight*! *Clarke*! *King*! *DISTRIB.* Europe.

Annual, stems 10-20 in. and leaves nearly glabrous. *Leaflets* truncate or notched, finely toothed; petiole short slender. *Heads* 4-20-fl., very small, flowers small turning ultimately brown. *Calyx* campanulate; pod obovoid.

This is so completely naturalised in the neighbourhood of hill-stations both in South and in North India that it must now be given a place in the Indian Flora.

12. *TRIGONELLA* LINN.

1. *TRIGONELLA OCCULTA* *Delile*.

Add to localities of *F. B. I.*:—RAJPUTANA; Marwar, *King*! CENTL. INDIA; *Jerdon*!

4. *TRIGONELLA HAMOSA* Linn.

No doubt Indian: localities of specimens in Herb. Calcutta are:—

UPPER GANGETIC PLAIN; Gohanee, *A. O. Hume*! near Etawah, *Duthie* n. 4594! CENTL. INDIA; *Jerdon*! *King*! RAJPUTANA; Jodhpur, *King*!

13. *MELILOTUS* JUSS.

1. *MELILOTUS INDICA* *All. Flor. Ped.* i. 308.

This being the older name must be substituted for the name *M. parviflora*.

15. LOTUS LINN.

1. LOTUS CORNICULATUS Linn.

Add to localities of *F. B. I.* :—

TENASSERIM ; on Taepo, at 5000 feet elev., *Gallatly* n. 836 !

A very curious extension of distribution, seeing that the species has not yet been reported from Upper Burma or from the Himalayas east of Nepal.

17. INDIGOFERA LINN.

2. INDIGOFERA LINIFOLIA Retz.

Add to localities :—UPPER BURMA ; *Dr. King's Collectors* !

4b. INDIGOFERA SQUALIDA Prain ; suffruticose, sparsely adpressed-pubescent, leaves subsessile ovate-lanceolate acute, flowers 12–18, in small sessile congested axillary racemes, pod straight tetragonous about 8-seeded, not torulose.

UPPER BURMA ; Koni, *King's Collector* ! Fort Stedman, *King's Collector* !

An undershrub $1\frac{1}{2}$ –3 feet high, branching near base only, persistently sparsely adpressed grey-pubescent. *Stipules* linear-subulate ; petiole 0–2 in. long, lamina chartaceous 2 in. long, .75 in. across. *Racemes* .3–5 in., rather longer in fruit. *Calyx* $\frac{1}{2}$ in. white-pubescent, teeth long setaceous. *Corolla* purple, twice the calyx. *Pod* deflexed, .75–1 in. long, the valves slightly adpressed-puberulous.

To leaves that, but for being sessile or nearly so, considerably resemble those of *I. Brunoniana* this species adds the habit, and practically the inflorescence and pods of the otherwise very different *I. trifoliata*.

5. INDIGOFERA CALONEURA Kurz.

Add to localities :—SHAN HILLS ; Lwekaw, 4000 feet, *Collett* 706 ! TENASSERIM ; Taepo, 5000 feet, *Gallatly* 714 !

6. INDIGOFERA BRUNONIANA Grah.

Recent gatherings of this species in Upper Burma show that it is as usual for the leaves to be 3-foliolate as to be simple. The species thus connects *I. caloneura*, which seems always to be 1-foliolate, with the next species.

6b. INDIGOFERA BELLA Prain ; shrubby, leaves odd-pinnate, leaflets 7–9 large, ovate-acute, stipules deciduous, racemes close-flowered rather large, peduncled, individual flowers short-pedicelled, pods cylindric many-seeded with somewhat thickened sutures and a very sharp abruptly upturned beak.

UPPER BURMA ; Myingin Hills, *Prazer* ! Kalay Hills, *Prazer* ! Pegu, *Kurz* !

A shrub 8–12 feet high ; branches long virgate slender slightly 4-angled. *Leaflets* quite glabrous above, very sparsely puberulous and very glaucous beneath, 3 in. long, 1.75 in. wide, rather conspicuously veined beneath ; stipules deciduous, stipels setaceous sub-persistent, leaf-rachis 4–5 in. long, petiolules .2 in. *Racemes* up to 8 in. long, copious. *Calyx* campanulate $\frac{1}{2}$ in., teeth short deltoid. *Corolla* white .6 in. long, standard thinly pubescent. *Pod* 2 in. long, glabrous, tip very abruptly recurved.

A handsome and striking species; apparently nearly related to a Central Chinese plant (*Henry* n. 3865).

8. INDIGOFERA TRIGONELLOIDES *Jaub. & Spach.*

Add to localities:—PANJAB; Amritsar, *T. Anderson* n. 123!

19b. INDIGOFERA CONSTRICTA *Trimen Cat. Ceyl. Pl.* 23; shrubby, branches and membranous leaves thinly clothed with adpressed grey hairs; leaflets 9-11 oblong-oval the side ones opposite, racemes elongated, pod long recurved, 3-7-seeded, constricted between the seeds. *Trimen Handbook Fl. Ceyl.* pt. ii. 27. *Indigofera flaccida* var. *constricta* *Thw. Enum.* 411; *Bak. in Flor. Brit. Ind.* ii. 99 (*sub I. tinctoria.*)

WESTERN INDIA; Canara, on Wuddee Ghat and on Nilkhund Ghat, *Talbot* nn. 320! 788! CEYLON; Motale East, *Thwaites* n. 3811!

A shrub 3-4 feet high, branches few virgate cylindric. *Leaflets* thin, glabrescent above, finely hairy on both surfaces, especially beneath. *Flowers* numerous, racemes about as long as leaves. *Calyx* silky, tube campanulate, teeth short triangular acute. *Pod* 1½ in., slightly recurved and 4-angled, pointed and much constricted between the seeds, sparingly silky.

This has been compared by Mr. Baker and by Dr. Trimén with *I. tinctoria*; in the writer's opinion the original comparison by Dr. Thwaites with *I. flaccida* (*I. subulata*) more truly indicates its natural affinities. It has quite the habit and appearance of *I. subulata* and is much less like *I. tinctoria* in facies. The *F. B. I.* compares *I. subulata* with *I. trita* but, so far as Calcutta specimens go, and we have 22 different gatherings of that species, all very uniform, the resemblance is far from striking; *I. trita* is always a much more rigid shrub than any of the three mentioned; *I. subulata* indeed is subsucculent.

Both *I. subulata* and *I. marginulata* are described by Mr. Baker (the former by Dr. Trimén also), as having leaves with 5 leaflets; Mr. Baker qualifies the statement further on by saying leaflets "always 5 on the leaves of the main branches." In specimens collected by Dr. Wight (*Wall. Cat.* 5475 and *Wight*, K.D. 667), almost all the leaves have 5 leaflets; also in specimens obtained by Mr. Gamble in the Anamallai Hills (*Gamble* n. 14592). In the only specimen of Dr. Roxburgh's collecting at Calcutta (from Golconda) and in Ceylon specimens (*Thwaites* n. 1460, *Beckett* n. 2378), the majority of the leaves have 7 leaflets.

Dr. Trimén describes *I. constricta* as having 9 leaflets. This is true of *Thwaites* n. 3811 and *Talbot* n. 788 but in *Talbot* n. 320 as many of the leaves have 11 leaflets as have 9.

25. INDIGOFERA HIRSUTA *Linn.*

Add to localities of *F. B. I.*:—SINGAPORE; *Hullett*!

28. INDIGOFERA TINCTORIA *Linn.*

As Mr. Kurz has pointed out (*Journ. As. Soc. Beng.* xlv. pt. 2. p. 269) *Indigofera Anil* is a very common wild or semi-wild species in Burma. It has now similarly found its way into the Andamans and become quite naturalised. Specimens from India are very rare. Mr. Kurz proposes that *I. Anil* should be looked on as a variety of *I. tinctoria*, a proposal for which there is much to be said. But Mr. Kurz's further belief that the *Indigofera argentea* var. *coerulea* of the *F. B. I.* should also be referred here seems quite untenable; that plant is, without any doubt, a form,

hardly even a variety, of the extremely distinct *I. argentea* Linn.—the species known as “Nil” in Rajputana. The “Nil” of most other parts of India—the Indigo plant (*I. tinctoria*)—is on the other hand known in Rajputana as “Jin-gini,” all the use made of it being that its seeds are sometimes eaten during periods of scarcity. If the form referred to by Mr. Baker must be treated as a variety it would perhaps be better to substitute the name VAR. *brachycarpa* or VAR. *retusa* for the name VAR. *coerulea*; it happens that Dr. Roxburgh’s *I. coerulea* is exactly = *I. argentea* Linn. and is not quite = *I. retusa* Grah. or *I. tinctoria* VAR. *brachycarpa* DC., both of these being exactly Mr. Baker’s plant.

29. INDIGOFERA WIGHTII *Grah.*

Add to localities of *F. B. I.*:—TENASSERIM; Endine-ghor, 1000 feet elev., *Gallatly!*

30. INDIGOFERA CYLINDRACEA *Grah.*

Add to localities of *F. B. I.*:—NAGA HILLS; Pulinabadza, 7500 feet elev., *Prain!*

31. INDIGOFERA LEPTOSTACHYA DC.?

Add to localities of *F. B. I.*:—UPPER BURMA; Maymyo and Lwekaw, *Dr. King’s Collectors!*

32. INDIGOFERA ATROPURPUREA *Ham.*

Add to localities of *F. B. I.*:—NAGA HILLS; Mao, *Clarke!* UPPER BURMA; Bhamo and Maymyo, *King’s Collectors!* Shan Hills, *King’s Collectors!* Karen Hills, *O’Reilly!* DISTRIB. Yunnan, at Momien (*J. Anderson*).

38. INDIGOFERA DOSUA *Ham.* var. *TOMENTOSA Bak.*

Add to localities of *F. B. I.*:—UPPER BURMA; Shan Hills, common.

18. PSORALEA LINN.

1. PSORALEA CORYLIFOLIA *Linn.*

Add to localities of *F. B. I.*:—

BURMA; Paghanyo, *Wallich!* Poneshee, *Anderson!* Meiktila, *Collett!* Shan States, very common, *King’s Collectors!*

In Burma the corolla is sometimes yellow, much more often it is reported as ‘blue’ or ‘purple;’ in India also it is more often quoted as ‘blue’ (*Gamble*) or ‘white with carina purple-tipped’ (*Hooker and Thomson*) than ‘yellow.’ The plant often reaches 5-6 feet in height.

1b. PSORALEA DRUPACEA *Bunge, Pl. Lehmann., 249;* herbaceous, leaves simple, racemes elongated, pod villous. *Boiss. Fl. Orient. ii. 187.*

NORTH-WEST HIMALAYA; Gilgit, *Giles!* DISTRIB. N. Persia, Turkestan.

An erect annual 3-4 feet high. Branches firm, striated, villous. Leaves distinctly petioled roundish widely serrate, harsh, conspicuously dotted; petiole villous, blades glabrescent. Flowers 25-50 in elongated lax racemes. Calyx subsessile villous $\frac{1}{8}$ in. long; teeth lanceolate the lowest slightly longest. Corolla bluish-white distinctly exserted. Pod obovate, densely villous, twice as long as calyx.

20. MILLETTIA W. & A.

The genus *Millettia*, here retained because its species are familiar under that name to residents in the East, does not differ, as Baron von Mueller has shown, from *Wistaria*. Unfortunately though *Wistaria* has become most familiar as the name of the genus it is by no means the oldest and therefore is not the one that ought to be employed. As Sir J. D. Hooker and Mr. Jackson show (*Index Kewensis* vol. ii. p. 1232) there are at least four names with a prior claim to being used. The oldest of these is *Kraunhia* (Raf. *Med. Rep. N. Y.* v. 352 [1808]) and the propriety of restoring the use of this name seems to be unquestionable. Dr. Otto Kuntze, however, proposes to employ the name *Phaseolodes*,—a modification of his own, of *Phaseoloides*, a name employed before the time of Linnaeus—to indicate the genus. To this the writer cannot agree, because of the inadvisability of employing an adjective, even when a wrong spelling is adopted, as the name of a genus.

1b. *MILLETTIA PUERARIOIDES* Prain; leaflets 5-7 membranous narrowly elliptic-oblong exstipellate densely silky beneath, standard densely silky on back, stamens monodelphous, pod glabrescent. *Millettia sericea* Kurz, *Journ. As. Soc. Beng.* xlv. pt. 2, 275; *For. Flor.* i. 353 not of W. & A. *Kraunhia puerarioides* Prain MSS.

TENASSERIM; Choungya, 4000 ft., *Gallatly* n. 531! PEGU; Tonkyeghat, Nakawachoung, Kurz n. 1765! UPPER BURMA; Poneshee, J. Anderson!

A woody climber, the branches glabrous and lenticelled. Leaves 2 feet long; leaflets 7-10 in. long, narrowed from the middle towards both extremities, the base cuneate, the apex very long caudate-acuminate, green and glabrous above, densely grey-silky beneath, the petiolules $\frac{1}{4}$ - $\frac{3}{8}$ in. long and the rachis densely brown-tomentose. Racemes lateral a foot long, the lower half naked the upper densely set with fascicles of pedicellate flowers. Calyx $\frac{1}{8}$ in., silky, scarcely toothed. Corolla $\frac{1}{4}$ in., pale-pink, very silky. Pod (unripe) 2-3 in. long, sparsely coated with adpressed hairs, becoming ultimately glabrescent.

This is the Burmese plant referred by Mr. Kurz to *M. sericea*; it is difficult to decide whether it differs most from that species as to pods, which are narrower and become, even while young, glabrescent; as to flowers, which are about half the size; as to inflorescence, which is much longer and narrower, or as to leaflets which are densely silky beneath with much longer hairs, which taper gradually into a very long caudate sharp point instead of being abruptly shortly bluntly cuspidate, and which are membranous in place of coriaceous.

Millettia sericea has never been sent to Calcutta from Burma.

4. *MILLETTIA PULCHRA* Bth.

VAR. *tomentosa*; branchlets and leaf-rachises densely tomentose, leaflets softly tomentose beneath. *Millettia tomentosa* Watt MSS. in *Herb. Calcutta*.

ASSAM; Silhet, *De Silva* (Wall. *Cat.* 5630 C)! Naga Hills, below Kohima, 3500 ft., Prain! Manipur, at Laireain, 3000 feet, Watt n. 6,274!

This variety is very different in appearance, owing to its tomentum, from the typical plant; its leaflets are also larger.

Colebrooke has written on *Wall. Cat.* 5630 C "Tephrosia pulchra?"; it seems probable that Dr. Watt is right in claiming specific rank for the form. Since, however, neither DeSilva, Watt nor the writer have collected fruits, and as there is no difference in flower between this and typical *M. pulchra*, it seems better, till fruits are obtained, to treat it only as a variety.

5. *MILLETTIA RACEMOSA Benth.*

Add to synonyms of *F. B. I.*:—*Millettia leiogyna Kurz, Journ. As. Soc. Beng.* xlii. pt. 2. 67. *Kraunhia racemosa Prain MSS.*

Add to localities of *F. B. I.*:—BEHAR; common, *Kurz!* BURMA; Pegu, Nagkawa, *Kurz!* Shan Hills at Toungyi, *King's Collectors!* Tenasserim, Thounghyen, *Gallatly!*

Like most *Millettias* this is slightly variable, but there is no essential difference between the Concan plant, and that from Behar and Orissa; the plant from Pegu and the Shan Hills is exactly like that from Behar, the plant in Tenasserim is exactly like that in the Concan and in Canara.

7b. *MILLETTIA MULTIFLORA Coll. & Hemsl. Journ. Linn. Soc.* xxviii. 41; leaflets 9-13, usually 11, coriaceous, ovate-oblong to rounded, stipellate, minutely strigosely hairy on both surfaces, at length glabrous, standard slightly silky, stamens 2-adelphous, pod sparsely silky indehiscent. *Kraunhia multiflora Prain MSS.*

BURMA; Shan Hills, *Collett n. 553! King's Collectors!*

A tree 30-40 ft. high, young branches rusty-tomentose. *Leaflets* obtuse 1-1.5 in. long, apex sometimes acuminate, sometimes rounded or even retuse, always rather firm, finely reticulated especially beneath; petiolules $\frac{1}{2}$ in. *Flowers* in fascicled racemes, shortly pedicelled. *Calyx* silky even in fruit. *Corolla* .7 in. long. *Pod* almost woody, straight pointed, uniformly covered with white silky hairs that do not conceal the raised reticulate nervation, 4 in. long, .75 in. across.

This is compared by its authors with *M. Brandisiana*; it seems also to have a marked affinity with *M. cana* which the writer does not, however, know well, there being but one example in Herb. Calcutta.

8b. *MILLETTIA WRIGHTIANA Prain*; leaflets ovate shortly cuspidate thickly chartaceous, at first uniformly softly velvety beneath, standard glabrous on the back, stamens monadelphous, pod flat on the face, woody, thin, sutures slightly thickened but not winged. *Kraunhia Wrightiana Prain MSS.*

BURMA; Shan Hills, *King's Collectors!*

Leaflets rather rigid. *Racemes* close simple 4-6 in. long with puberulous rachis. *Pedicels* exceeding the calyx, slender, with a linear bracteole at calyx-base. *Calyx* $\frac{1}{2}$ in., puberulous; teeth very short. *Corolla* $\frac{3}{8}$ in., standard 2-callose at base. *Pod* 3-4 in. long, .5 in. wide.

Most nearly related to *M. glaucescens* from which it differs chiefly in the thinner pod not winged along the sutures and not lenticelled along the valves, also in its smaller bracts and its shorter puberulous rachis. The leaves when old are at times only pubescent on the nerves as in *M. pubinervis*, and at times glabrous beneath as in *M. glaucescens*.

The species is named in honour of Mr. Wright of the Kew Herbarium staff.

9. *MILLETTIA PUBINERVIS* Kurz.

This is more like an *Otosema* than a *Eumillettia* because the standard is 2-callose; its racemes are not leaf-opposed. Its nearest ally among the species described in the *Flora of British India* is *M. glaucescens* Kurz, which also has a 2-callose standard. These two, with three other species—*M. Hemsleyana*, *M. Wrightiana* and *M. decipiens*, and with apparently a fourth from Borneo, of which the fruit is still unknown, and a fifth, *M. dehiscens*, from Java, constitute an extremely natural group of forms. This one has recently been obtained again in Tenasserim by Gallatly, but the fruit is still unknown.

9b. *MILLETTIA HEMSLEYANA* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 90; leaflets narrowly elliptic-obovate or lanceolate-acuminate, glaucous and softly pubescent ultimately glabrescent beneath except on main nerves, stipules large ovate deciduous, standard glabrous on the back, ovary pubescent, pod narrow thin glabrous, sutures slightly thickened not winged. *Kraunhia Hemsleyana* Prain MSS.

PERAK; Pulo Kamiri, Wray 3310! 3608!

An erect tree, the young parts puberulous. *Leaves* 6-8 in. with puberulous rachis, leaflets 4-5 pairs, 2-3 in. long, chartaceous. *Racemes* axillary, rachis puberulous, slender, simple, bracts large lanceolate, pedicels capillary pubescent solitary or fascicled. *Calyx* pale-green tinted with claret, broader than deep, $\frac{1}{10}$ - $\frac{1}{8}$ in., densely pubescent. *Corolla* white faintly tinged with pink, standard $\frac{1}{2}$ in. long, 2-callose at base. *Pod* 3-4 in. long, $\frac{1}{5}$ in wide.

This is very closely related to *M. pubinervis* and seems to be its representative in Perak. It is however readily distinguished by its large stipules nearly $\frac{1}{4}$ in. long, and its large bracts.

The species is named in honour of Mr. Hemsley, Principal Assistant, Royal Herbarium, Kew.

9c. *MILLETTIA DECIPIENS* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 90; leaflets lowest pair broadly ovate the rest elliptic-obovate all obtusely acuminate, green on both surfaces, with a few sparse hairs on the midrib beneath; standard densely silky on the back, ovary pubescent, pod narrow thin glabrous, sutures not thickened. *Kraunhia decipiens* Prain MSS.

MALAY PENINSULA; Perak, *Scortechini*! Wray! Pahang, *Ridley*!

A spreading tree 40-50 feet high, 2-3 feet in diam., branches glabrous. *Leaves* 6-8 in., rachis glabrous, leaflets 4-5 pairs, basal $1\frac{1}{2}$ the others $2\frac{1}{2}$ -3 in. long 1- $1\frac{1}{4}$ in across. *Racemes* slender, axillary, simple, 6-8 in. long; pedicels capillary, puberulous, solitary or fascicled. *Calyx* reddish, slightly pubescent. *Corolla* pink, standard above $\frac{1}{2}$ in. long, 2-callose at base; ovary pubescent, ovules 4.

Very near the preceding but easily distinguished by the silky standard; also very near *M. glaucescens* but further easily distinguished by the different pod. The flower of this species is, but for its rather smaller size, remarkably like that of *Pongamia glabra* and can only be safely distinguished by its ovary having 4 instead of 2 ovules. Another species very closely related to this is the Javanese *Millettia dehiscens* (*Pongamia dehiscens* Koord. & Val., *Bijdr.* ii. 96) from which this perhaps only differs as a variety.

10. *MILLETTIA MONTICOLA* Kurz.

This is not a *Millettia* but a *Derris*; it is not confined to Burma, but extends to the Khasia Hills, where it has been collected by Capt. Badgely and by Mr. Mann, and to the Daphla Hills where it has been obtained by Mr. Lister. It should therefore be known in the meantime as *Derris monticola*. But, from the description, it seems closely related to, and may prove to be the same as, the imperfectly known *Derris secunda* Bak., of which the writer has seen no specimen.

It may be mentioned that, on the other hand, the species described as *Derris microptera* by Mr. Benthams has quite dehiscent pods and should be treated rather as a *Millettia* than as a *Derris*. There seems to be little doubt that it is the same as *Derris acuminata* Benth., and if so it must to be known as *Millettia*, or *Kraunhia*, *acuminata*.

10b. *MILLETTIA MACROSTACHYA* Coll. & Hemsl. Journ. Linn. Soc. xxviii. 41; leaflets 9-11, membranous, ovate-oblong obtusely acuminate, stipellate, softly sparsely hairy ultimately glabrescent beneath, standard sparsely silky on the back; stamens diadelphous; pod flat long narrow rigidly coriaceous glabrous. *Kraunhia macrostachya* Prain MSS.

BURMA; Shan Hills, 2000 to 4000 feet, Collett! King's Collectors!

A small tree, about 20 feet high, young shoots glabrescent. Leaves 1-1½ feet long, leaflets shortly petiolulate 2-6 in. long, pale-green, glabrous above, sparsely covered at first with grey pubescence but ultimately glabrous beneath. Racemes axillary as long as the leaves or longer; flowers shortly pedicelled. Calyx wide, sub-2-labiate, the two upper teeth forming a deltoid lip. Corolla rose-coloured, nearly 1 in. long, externally puberulous; standard rounded. Ovary sessile pubescent. Pod quite glabrous.

11. *MILLETTIA PACHYCARPA* Benth.

Add to localities of *F. B. I.*:—UPPER BURMA; Poneshee, J. Anderson! Shan Hills, at Koni, Prazer! Delete from localities of *F.B.I.*:—MALACCA.

In the Khasia Hills this is known as 'Kharina' and the fruits are used in poisoning streams to catch fish.

The Malayan plant referred to this species in the *F. B. I.* has very similar flowers, leaves and stems. But the leaflets are always smaller and the standard in place of being glabrous is very silky outside; the plant itself (*Griffith* n. 1769) is not at Calcutta but the recent Malayan gatherings identified with it at Kew belong to *Derris elliptica* Bth.

12b. *MILLETTIA DORWARDI* Coll. & Hemsl. Journ. Linn. Soc. xxviii. 40; leaflets 5 ovate-oblong, cuspidate, coriaceous, stipellate, soon glabrescent beneath, standard densely silky on the back, stamens diadelphous.

BURMA; Shan Hills at Koni, Collett! Prazer!

An erect tree (*Collett* n. 773!) or a woody climber (*Collett* n. 759! Prazer!) young branches thickish and leaves beneath puberulous soon becoming glabrous. Leaflets 2-4½ in. long, paler beneath, stipels subulate. Racemes in a dense panicle above the leaves, flowers pedicelled 2-bracteolate. Calyx ½ in., densely silky, teeth rounded. Corolla 75 in., densely grey-silky. Ovary sessile densely villous; pod not seen.

Very closely related to *M. cinerea*; its smaller firmer leaflets and its much larger buds and flowers give it however, in all stages, a facies of its own.

The authors of the species had, they write, considerable hesitation about giving specific rank to this plant which they think may perhaps after all be only a variety of *M. cinerea*. Dr. King has very kindly examined the specimens with the writer and likewise agrees in thinking that Sir H. Collett and Mr. Hemsley were justified in according it specific rank. It is oftener a climber than a tree; fruits are still unfortunately wanting.

15. *MILLETTIA GLAUDESCENS* Kurz.

Add to localities of *F. B. I.*:—SIKKIM; Terai at Panchenai and Chunbati, *Gamble* 689! 2240! MALAY PENINSULA; Perak, *Wray* n. 168! *Ridley*! *Scortechini*!

Both in Sikkim and in Perak this is an erect tree. Its affinities are altogether with *M. pubinervis*, *M. Hemsleyana*, *M. Wrightiana*, *M. dehiscens* and *M. decipiens*. Like these species it has a 2-callose standard and ought perhaps to be removed from the section in which it is placed in the *F. B. I.*

The following key may assist in explaining the relationships of the species of the group to which *M. glaucescens* belongs, all the members of which have exstipellate leaves, and all of which except *M. glaucescens* itself have densely silky ovaries.

Standard pubescent on the back, (flowers pink):—

Leaflets 5-7, thinly adpressed-silky beneath,

ovules 2... .. 1. *Millettia* (*sp. borneensis*.)

Leaflets 7-9 with only a few sparse hairs on midrib beneath:—

Ovules 4 2. *Millettia decipiens*.

Ovules 5 or more 3. *Millettia dehiscens*.

Standard glabrous on the back, (ovules 6):—

Standard longer than broad, flowers yellowish-white or white:—

Petals yellowish-white with purple veins, calyx black-purple, stipules and bracts small ... 4. *Millettia pubinervis*.

Petals white flushed with pink, calyx green tinged with claret, stipules and bracts large 5. *Millettia Hemsleyana*.

Standard as broad as long, flowers blue:—

Pod thin without lenticels, sutures not winged ... 6. *Millettia Wrightiana*.

Pod thick woody lenticular, sutures winged ... 7. *Millettia glaucescens*.

The Bornean species mentioned occurs in Mr. Haviland's collection from that island, of which a complete set is present in the Calcutta Herbarium. No fruit has been collected and as it has only 2 ovules it is not possible to predict with certainty whether it may prove a *Millettia* or a second species of *Pongamia*, though the probabilities are somewhat against its belonging to the latter genus. In any case the writer is precluded from employing a distinctive name for the species since Mr. Haviland has expressly requested that none of his probably new species shall be named in Herb. Calcutta. The field-ticket of the specimen in question bears the marks "c. k. q. g."

18. *MILLETTIA ERIANTHA* Benth.

Add to localities of *F. B. I.*:—PERAK; Wray! *Scortechini*! PAHANG; SINGAPORE; *Ridley*!

22. *MILLETTIA EXTENSA* Benth.

This species must be deleted from the list. Its foliage, flowers and fruit are exactly those of *Millettia auriculata* Bak. If retained as a variety it can only be distinguished, and then not in every case, by its rather shorter racemes.

23. *MILLETTIA LEIOGYNA* Kurz.

This species also must be deleted; it is simply *Millettia racemosa* Benth., differing in no respect from the Indian plant. Roxburgh's Orissa plant does not in any way differ from the Concan one. The species is quite as common in Central India and in Behar as it is in the Concan. In Burma it extends from Tenasserim to the Shan Plateau.

25. *MILLETTIA CAULIFLORA* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 94; leaflets 13, upper oblong, lower ovate, base somewhat obliquely rounded, apex long caudate-acuminate; stipellate; flowers solitary from small conical papillae along leafless stem; pod closely silky-tomentose, not woody.

LARUT; Perak, *Kunstler* n. 2558!

A shrub 6-8 feet high, with dark lenticelled bark and with short conical flower-bearing processes in axils of fallen leaves. Leaves clustered at apex of stem; stipules subulate, caducous; rachis rusty-puberulous as are the petiolules and the setaceous persistent stipels; leaflets thin, glabrous on both surfaces, bright-green, dull beneath with 5-7 pairs of prominent lateral nerves, shining above with nerves and midrib slightly impressed; the lowest leaflets 2 in. long, 1.25 in. across, terminal and upper 2-3 pairs 6 in. long, 2 in. wide. Calyx .2 in., glabrescent. Corolla apparently pink. Pod 3-3.5 in. long, .6 in. wide, narrowed towards base, slightly recurved, rigidly coriaceous, closely grey silky-tomentose.

A very distinct species with leaves very like those of *Millettia macrophylla* Hook. fil., but with fewer lateral nerves and with a very different inflorescence. The pods in this species have thinner valves than in any of the other Indian species except *Millettia pulchra* which, however, it in no other respect recalls. It is doubtful if this species belong really to § *Otosema*; it resembles much in foliage and habit a Sumatran species* which has however different pods, exstipellate leaflets, and very different stipules; this species (*M. stipularis*) is an *Eumillettia*.

* *MILLETTIA STIPULARIS* Prain; leaflets 17-19, upper oblong, lower ovate, base rounded, apex rounded abruptly narrowly caudate; exstipellate; flowers in short racemes from small conical papillae along leafless stem; pod glabrous not woody.

SUMATRA; R. Roepit, 300 feet, *Forbes* n. 2948!

A shrub 8 feet high with ash-grey bark and with short conical raceme-bearing processes in axils of fallen leaves. Leaves 2 feet long with glabrous rachis, clustered at apex of stem; stipules very large, obliquely oblong, acute, .9 in. long, .25 in. wide, persistent; leaflets lowest pair 3 in. long, 1.5 in. wide; terminal and upper pairs 6-8 in. long, 2.25 in. across, glabrous on both surfaces, green shining above, dull with prominent midrib and 8-10 pairs of lateral nerves beneath. Racemes 1-3 from each papilla, 3-5 in. long, 10-15-fl., flowers shortly pedicelled, usually solitary on small produced nodes showing traces of 3-5 abortive or fallen flowers. Calyx .12 in.,

26. *MILLETTIA ALBIFLORA* Prain, *Journ. As. Soc. Beng.* lxxi. 2. 92; leaflets 5, rarely 7, more rarely only 3, elliptic-lanceolate, apex caudate, subcoriaceous, glabrous; standard glabrous; stamens monadelphous; pod very large flat rather woody, finely brown-velvety.

MALAY PENINSULA; Perak, common. Pahang, Ridley n. 2641!

A large spreading tree sometimes 80–100 feet high (*Kunstler*) usually 30–50 feet, trunk 2–3 feet in diam. Leaflets 5–10 in. long, 1·5–2·5 in. across, lowest pair rather smaller, shining above, dull beneath; petiolule .25 in. Flowers in long narrow panicles longer than the leaves, from the upper axils of branches, often 1–1·25 ft. in length; individual racemes 4–6 in., flowers solitary on pedicels .15 in. long; peduncles, pedicels and calyx all rusty-puberulous. Calyx .25 in. long, tube campanulate, teeth triangular rather shorter than tube, the two upper connate emarginate. Corolla pure-white, .75 in. long, standard orbicular 2-auriculate above the claw. Vexillary filament cohering half way up the staminal sheath, or at length free. Ovary puberulous. Pod linear, 7–13 in. long, 1·5–2 in. wide, softly brown-velvety.

27. *MILLETTIA UNIFOLIATA* Prain, *Journ. As. Soc. Beng.* lxxi. 2. 93; leaflets solitary obovate-oblong or lanceolate, subcoriaceous, glabrous; standard glabrous; stamens monadelphous; pod large flat, rather woody, finely pale yellowish-velvety.

MALAY PENINSULA; Pangkore, Curtis n. 1615! Perak, Wray n. 2836! Scortechini 124! 1023! 1711! Kunstler 4251! 4492! 8210!

A spreading tree 30–40 feet high, trunk 1 foot in diam., branches glabrous. Leaflets with reticulations visible on both surfaces, 6–8 in. long, 1·5–3 in. wide, beneath dull, above shining. Flowers in very slender axillary panicles shorter than the leaflets, individual racemes short, few-fl., separated by intervals 1 in. long, peduncles pedicels and calyx-tube glabrous. Calyx .2 in. long, 2-bracteolate at the base, bracteoles ovate-lanceolate very small, teeth glabrous externally pubescent within. Corolla .75 in. long, pure-white, standard orbicular retuse, 2-callose at base of lamina. Stamens monadelphous in a sheath split along vexillary side. Ovary puberulous. Pod linear, 6 in. long, 1 in. across, tapering to both ends.

Very distinct owing to its 1-foliate leaves but nevertheless very closely related to the preceding species, which in leaflets, buds, corolla and pods it much resembles.

28. *MILLETTIA MAINGAYI* Bak. in *Flor. Brit. Ind.* ii. 110.

Add to description of *F. B. I.*:—

A creeper over 100 feet long. Leaves light green. Flowers in small axillary panicles one-third as long as leaves, 2·5 in. long, 1·5 in. across, rachis and pedicels rusty-pubescent. Calyx campanulate, externally rusty-pubescent, .2 in. long, teeth wide-triangular half as long as tube. Corolla white tinged with pink, .5 in. long, standard orbicular emarginate, slightly puberulous externally.

rusty-puberulous. Corolla purple, standard orbicular .3 in. long, emarginate, externally slightly pubescent, exauriculate. Stamens monadelphous. Mature pod quite glabrous, linear, straight, rigidly coriaceous, 3–4 in. long, .5–.75 in. broad.

The flower of this species are like those of *M. caudata*, as are the pods; the standard is however without auricles.

Add to localities :—SELANGOR ; 800–1200 feet, *Kunstler* 8759 !

To the kindness of Mr. Ridley the Calcutta Herbarium owes the possession of excellent flowering and fruiting specimens from a plant cultivated in the Singapore Botanic Garden. Mr. Kunstler has collected in flower, in Selangor, specimens that agree in every detail with Mr. Ridley's flowering specimens.

29. *MILLETTIA OOCARPA* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 92 ; leaflets 9–13, oblong, subcoriaceous, terminal usually much larger than the others, rounded at base, apex acute, glabrous finely reticulate beneath ; standard very sparsely silky externally ; stamens monadelphous ; pod large egg-shaped, softly dark-brown velvety.

PERAK ; *Scortechini* n. 429 ! *Wray* n. 2141 !

A climber, leaves light-green above, whitish beneath, 6–8 in. long, rachis-puberulous, leaflets 2–3 in. long, 1–1·5 in. wide, terminal exceeding the others. *Flowers* in small axillary panicles one-half as long as leaves, rachis and pedicels slightly puberulous, 2·5 in. long, 1·5 in. across. *Calyx* campanulate, externally grey-puberulous, 2 in. long, teeth obscure. *Corolla* white tinged with pink, 5 in. long, standard uniformly sparsely puberulous externally, orbicular, entire. *Stamens* diadelphous, vexillary filament free. *Ovary* 2-ovuled, densely pubescent. *Pod* shape and size of a fowl's egg, 3·5 in. long, 1·75 in. in diam., densely softly brown-velvety.

Nearly related to the preceding species but very distinct by reason of its leaflets glabrous beneath, and its very different pod.

22. *TEPHROSIA* PERS.

1. *TEPHROSIA TENUIS* Wall.

Add to localities of *F. B. I.* :—BURMA ; Segain Hills, *Wallich* n. 5970 ! Shan Hills, *King's Collectors* ! LACCADIVE ISLANDS ; Cardamum, *Alcock* ! Aucutta, *Alcock* !

2. *TEPHROSIA CANDIDA* DC.

Add to localities of *F. B. I.* :—MALAYA ; Singapore, *T. Anderson* n. 43 ! *Hullett* n. 670 ! perhaps introduced.

4. *TEPHROSIA TINCTORIA* Pers.

VAR. coccinea Bak. (*T. coccinea* Wall.) : in the light of the specimens received from Upper Burma since the plant was first issued by Dr. Wallich this seems to deserve recognition as a species. It differs more from typical *T. tinctoria* as regards foliage than does *T. calophylla* Bedd. and it has at the same time the long lax racemes on the strength of which *T. calophylla* is kept separate from *T. tinctoria*.

4b. *TEPHROSIA GRAHAMI* Wall. *Cat.* 5652 ; slender, branches finely adpressed-sericeous, leaves simple large oblong-lanceolate obtuse mucronate sessile, rarely casually petioled and then sometimes with a pair of diminutive basal leaflets ; flowers very lax on long slender axillary peduncles. *Kurz* in *Journ. As. Soc. Beng.* xlv., pt. 2, 272. *T. tinctoria* W. & A. *Prodr.* i. 211 ; *Bak.* in *Flor. Brit. Ind.* ii. 112 in part, hardly of *Pers.*

BURMA; Prome, *Wallich!* Kurz n. 2529! South Mingyin, *Prazer!*

General habit of *T. tinctoria* but more slender, leaves $2\frac{1}{2}$ in. by $\frac{3}{4}$ in. Peduncles 1-3-fld., 2-3 in. long. *Calyx*, corolla and pod as in *T. tinctoria*.

As represented by the large suites of specimens collected by Kurz and Prazer this is very uniform and distinct; the writer therefore has preferred Mr. Kurz's view to that expressed in the *Prodromus* and in the *Flora of British India* which are both based on the examination of Dr. Wallich's solitary gathering.

7b. *TEPHROSIA PUMILA* Pers. *Synops.* ii. 320. *T. diffusa* W. & A. *Prodr.* i. 213. *Galega diffusa* Roxb. *Flor. Ind.* iii. 387. *T. purpurea* VAR. *pumila* Bak. in *Flor. Brit. Ind.* ii. 113; *Prain, Bot. Laccad.* 35.

Further examination of the very extensive material in Herb. Calcutta serves to confirm the writer in the opinion expressed by him in 1892 that this plant must be re-recorded specific rank.

23. SESBANIA PERS.

Key to the Indian Species.

Flowers small, bud straight (SUBGEN. I. *EUSESBANIA*):—

Pods twisted, pendulous; flowers $\frac{1}{2}$ in. long or upwards;
(unarmed):—

Perennial; stems woody; flowers $\frac{5}{8}$ in.; pods 6 in. \times $\frac{1}{8}$ in., sutures undulate and valves widely depressed between the seeds; a small tree ... 1. *S. ægyptiaca*.

Annual; stems pith-like; flowers $\frac{3}{4}$ in.; pods 10-12 in. \times $\frac{3}{16}$ in., sutures straight, valves slightly abruptly depressed between the seeds; a swamp species with tree-like habit ... 2. *S. paludosa*.

Pods not twisted, erect or ascending (except at times in *S. cannabina*); flowers never exceeding $\frac{3}{8}$ in.; all annuals with woody stems:—

Leaves and branches sericeous-tomentose; (unarmed); pods not torulose ... 3. *S. sericea*.

Leaves and branches glabrous:—

Stems and rachises of leaves smooth:—

Stems erect, very tall; pods with straight sutures and undeprressed valves oftenest spreading or pendulous, 4-8 in. \times $\frac{1}{8}$ in. ... 4. *S. cannabina*.

Stems diffuse procumbent; pods subtorulose erect 3-4 in. \times $\frac{1}{10}$ in. ... 5. *S. uliginosa*.

Stems and rachises of leaves armed with weak prickles:—

Stems erect; fruiting raceme several-podded; flowers $\frac{3}{8}$ in.; pods 9-12 in. \times $\frac{1}{8}$ in., sutures slightly undulate, valves widely depressed ... 6. *S. aculeata*.

Stems prostrate; fruiting raceme usually 1-podded, flowers $\frac{1}{4}$ in.; pods 3 in. \times $\frac{1}{12}$ in. distinctly torulose ... 7. *S. procumbens*.

Flowers large (3 in. long); bud falcately recurved (SUBGEN.

II. *AGATI*)... 8. *S. grandiflora*.

An examination of the species of this genus that occur in Bengal, when living examples and not merely herbarium material are dealt with, shows that the only good account of them hitherto published is that by Dr. Roxburgh who treated them as species of *Aeschynomene*.

1. *SESBANIA ÆGYPTIACA Pers.*

The *Jait*, *Jayti* or *Jaynti*; a very familiar hedge plant in Indian fields and gardens. Its wood is still, as in Dr. Roxburgh's day, highly reputed as a source of charcoal for gunpowder manufacture. The fact that this is a small tree, lasting for several years, has prevented any confusion between it and the other species in the field. In herbaria however it is often mixed with the second species which like it has twisted pods and which has even larger flowers; in literature on the other hand, this second species is referred to *S. aculeata*. *S. ægyptiaca* is, by colour of flowers merely, separable into three varieties:—

1. *typica*; flowers uniformly yellow. *Sesban P. Alpin, Pl. Ægypt.* 81. t. 82; *Kedangu Rheede Hort. Malab.* vi. 49, t. 27; *Emerus Burm. Fl. Zeyl.* 93, t. 41. *Plukenet, Phytogr.* t. 165, f. 2.

Wight and Arnott refer here another figure of Plukenet's, while they refer Rheede's fig. to VAR. 3 and Burman's to VAR. 2. Both the latter authors however speak of the flowers simply as yellow. This seems to be one of the original Indian forms, it is however much more rarely grown now-a-days than either of the other two varieties.

2. VAR. *picta*; standard externally dotted with purple. *Plukenet, Phytogr.* t. 164, f. 5. *S. picta Pers. Synops.* ii. 316; *Lindl. Bot. Reg.* t. 873. *Aeschynomene picta Cav. Ic.* iv. 7, t. 314. Apparently not originally native in India though now very widely cultivated there. From a perusal of Rheede's description and from Burmann's diffidence about referring Plukenet's figure of this plant to his *Emerus* it seems fairly clear that this variety had, in Rheede's and Burmann's time, already reached India from America, where it seems truly native. This particular variety is commoner in Bengal than the typical form but is not nearly so common as the next. In Burma on the other hand this and the next appear to be equally common.

3. VAR. *bicolor* W. & A. *Prodr.* 214; standard dark-maroon or purple outside. *Aeschynomene Sesban Roxb. Flor. Ind.* iii. 332. *Sesbania picta Hort. Calcutta; Flor. Brit. Ind.* ii. 114 not of *Pers.* and not of *Bot. Reg.*

This form is as common in Burma as the preceding and in Bengal is the one that is usually cultivated. It has long stood in Indian gardens as the representative of the name *S. picta*; this misapprehension, no doubt owing to reliance placed upon wrongly-named specimens distributed from the Calcutta Herbarium, has crept into the *Flora of British India*.

2. *SESBANIA PALUDOSA Prain, Journ. As. Soc. Beng.* lxvi. 2. 82; very tall annual marsh-plants of tree-like habit, quite unarmed; flowers large, pod long twisted flexible with strong, not indented sutures. *S. grandiflora Mig. Flor. Ind.-Bat.* i. 288 not of *Pers.* *S. cochinchinensis Kurz As. Soc. Beng.* xlv. 2, 271 not of *DC.* *S. aculeata* VAR. *paludosa Bak. in Flor. Brit. Ind.* ii. 115 (*excl. syn. Aeschynomene uliginosa.*) *S. punctata Bth. MSS. in Herb. Kew.* not of *DC.* *Aeschynomene paludosa Roxb. Hort. Beng.* 56; *Flor. Ind.* iii. 333 not *S. paludosa Jacq.*

BENGAL; in stagnant pools near villages and in swamps, very common. BURMA; not infrequent in swamps and swampy pastures all over the plains of Pegu, *Kurz!* MALAY PENINSULA; open marshy ground in Kedah near rice fields, *Kunstler* n. 1712! DISTRIB. Java (*Horsfield!*) Formosa (*Henry* n. 1802!)

A large tree-like annual reaching 12 ft. in height, stems 2 in. in diam. full of white pith; no prickles on stems or leaf-rachises. Leaves 8-12 in., sessile, leaflets 10-30 pairs, sparsely hirsute above. Racemes drooping, 8-12-fld., about as long as the leaves in whose axils they arise. Flowers yellow, the standard externally dotted with small purple spots, $\frac{3}{4}$ in. long. Pods 10-12 in., always pendulous and always twisted.

This is the familiar *Kathsola* of Bengal, so named because of its great similarity in appearance to *Aeschynomene aspera*, the true *Sola*; the pith of this being a little harder it is known as the *Kath* (woody) *sola*. Though it is preferable to use Roxburgh's epithet "*paludosa*" for the species it must be pointed out that this is not *S. paludosa* Jacq. That species, as the description of the flowers and fruits shows, is *S. uliginosa* Sweet (*Aeschynomene uliginosa* Roxb.) Mr. Baker, it is true, identifies *A. paludosa* with *A. uliginosa* (*Flor. Brit. Ind.* ii. 115); both are *Sesbanias* and both grow in swamps, but as they differ in habit, in foliage, in flowers and in fruit it seems better to keep them separate. Mr. Kurz thinks this may have been what Loureiro meant by *Coronilla cochinchinensis*, but as that species has erect torulose pods, the identification is impossible. Dr. Kuntze's treatment of this form (*Rev. Gen. Pl.* i. 181) which he reduces to *S. ægyptiaca*, makes it clear that he never saw the plant itself; his whole discussion is an excellent example of the unscientific use of the imagination.

3. *SESBANIA SERICEA* DC. *Prodr.* ii. 266. *S. aculeata* var *sericea* Benth. in *Thw. Enum.* 441; Bak. in *Flor. Brit. Ind.* ii. 115; *Trimen*, *Flor. Ceylon*, 34.

CEYLON; Colombo, *Ferguson!*

There is no doubt that this differs specifically in the points noted by Mr. Baker. The pods most resemble those of *S. cannabina*, the foliage that of *S. paludosa*. It has been only once collected in Ceylon, and may possibly be an introduced species.

4. *SESBANIA CANNABINA* Pers. *Synops.* ii. 316; annual unarmed, racemes few-fld., short but distinctly peduncled, pods very often solitary, rarely more than 2, spreading or pendulous very rarely erect, rigid not twisted, sutures stout straight, valves not depressed between the seeds.

INDIA and BURMA; cultivated only.

This is the *Dhunchi* plant which is quite as well known to European residents as the *Jaynti* or the *Kathsola*, and which differs so greatly in habit, flowers and fruit from these that by no licence can they be conceived conspecific. This is *Aeschynomene cannabina* Retz. *Obs.* v. 26; *Roxb. Flor. Ind.* iii. 335; *S. cannabina* DC. *Prodr.* ii. 265; *S. affinis* Schrad. in DC. *Prodr.* ii. 265. It must, however, be noticed that it is not the *S. cannabina* of Wight & Arnott (*Prodr.* 215), as an examination of their specimens and a perusal of their description shows. The fibre of *Dhunchi* is sometimes used instead of *Jute* fibre for various purposes, its chief employment being by fishermen for nets and lines, the fibre having a reputation for resisting the effects of

water better than many others. But it is for its tall and slender stems which sometimes reach 20 feet in height without being more than '5 in. thick at the base, and which are always hard, never soft and pith-like as in *S. paludosa*, that the plant is mainly cultivated; these long lithe stems are used as the wattles of which are constructed the walls of the houses wherein *Piper Betle* is grown.

5. *SESBANIA ULIGINOSA* Sweet *Hort. Brit.* 129; diffuse, unarmed, racemes short few-fl'd., pods erect subtorulose, not twisted. *Aeschynomene uliginosa* Roxb. *Hort. Beng.* 56, *Flor. Ind.* iii. 334. *S. paludosa* Jacq. in *DC. Prodr.* ii. 265 not *Aeschynomene paludosa* Roxb.

BENGAL; in swamps.

This species Dr. Roxburgh compares with the South Indian *S. procumbens*, and Wight and Arnott would endorse this comparison. What these authors mean precisely when they say that Roxburgh's *A. uliginosa* is not the *S. uliginosa* of "authors," is hardly clear, for there would appear to be only one published *S. uliginosa*, that of Sweet, which is founded, Sweet indicates, on the *Aeschynomene uliginosa* of the *Hortus Bengalensis*. It is just possible that the *S. uliginosa* referred to by Wight is *S. paludosa* (*Aeschynomene paludosa* Roxb.)

6. *SESBANIA ACULEATA* Pers. *Synops.* ii. 316 (*excl. citations* Plunkenet and Rheede); *DC. Prodr.* ii. 265; *Bak. in Flor. Brit. Ind.* ii. 114 (*excl. all the varieties*).

A weed of rice fields and swamps throughout India. Two more or less distinct varieties are recognisable. They differ, however, only in habit, the flowers and fruits of the two are identical and intermediates are numerous.

1. *typica*; stems reddish, rather densely sprinkled with minute prickles. *Aeschynomene spinulosa* Roxb. *Flor. Ind.* iii. 333. *S. aculeata* W. & A. *Prodr.* 215 (*excl. syn. A. cannabina* Roxb. and *A. bispinosa* Jacq.).

2. *VAR. elatior*; stems green, sparsely prickly, taller, lax and slender. *Aeschynomene bispinosa* Jacq. *IC. Rar.* iii. t. 564. *Coronilla cochinchinensis* Lour. *Flor. Cochinchin.* ii. 552. *S. cochinchinensis* DC. *Prodr.* ii. 266. *S. cannabina* W. & A. *Prodr.* i. 215 not *Aeschynomene cannabina* Roxb.

Wight and Arnott refer Roxburgh's *Aeschynomene cannabina*, the *Dhunchi* plant, to *S. aculeata*. This is so obviously wrong that the only conclusion to be formed is that they never had an opportunity of examining a *Dhunchi* plant. And that they are right in regarding their *S. cannabina* (which the writer cannot separate specifically from their *S. aculeata*) as the plant that Retzius named *Aeschynomene cannabina* and that Willdenow named *Coronilla cannabina*, is highly improbable. The description given by Retzius really only fits well, among Indian *Sesbanias*, Wight and Arnott's own *S. procumbens*. It is merely the fact that Retzius has said, on Koenig's authority, that the plant to which he refers is the fibre-yielding species (and therefore the *Dhunchi*), which has led Roxburgh, whom the writer is quite willing to follow, to apply the name "*cannabina*" to the *Dhunchi* plant.

7. *SESBANIA PROCUMBENS* W. & A. *Prodr.* i. 215; *Bak. in Flor. Brit. Ind.* ii. 115. *Aeschynomene procumbens* Roxb. *Flor. Ind.* iii. 337.

As already mentioned this is the species which best fits the description given by Retzius of *Aeschynomene cannabina*; the reasons that have led the writer to adopt the Roxburghian interpretation have been stated.

8. *SESBANIA GRANDIFLORA Pers.*

Often cultivated, especially in Southern India, as a support for the Pepper-Vine.

24. *CARAGANA LAMK.**Key to the Indian Species.*

- Leaf-rachis suppressed *C. pygmæa*.
 Leaf rachis produced :—
 * Leaf-rachis terminating in a naked point :—
 Leaf-rachis persisting as a woody spine after fall of leaflets ;
 calyx-teeth long :—
 Ripe pods woolly within :—
 Pods short, hardly thrice calyx, hirsute externally ... *C. Gerardiana*.
 Pods long, 4–5 times calyx, glabrous externally ... *C. brevispina*.
 Ripe pods glabrous within :—
 Leaflets lanceolate, longer than broad :—
 Leaflets pubescent with long spreading hairs on both
 surfaces *C. chumbica*.
 Leaflets glabrous above, sparsely adpressed-pubescent
 below *C. conferta*.
 Leaflets hardly longer than broad, oblong or ovate :—
 Leaflets densely pubescent, pod glabrous ... *C. polyacantha*.
 Leaflets finely hoary, pods pubescent :—
 Pods turgid curved, abruptly pointed ... *C. ambigua*.
 Pods narrow straight, gradually tapering ... *C. ulicina*.
 Leaf-rachis usually deciduous with leaflets ; calyx-teeth
 short :—
 Stipules persistent as strong spreading woody spines ;
 flowers solitary *C. Aitchisoni*.
 Stipules weakly spinescent ; flowers several from one node *C. arborescens*.
 Leaf-rachis bearing a leaflet at its tip :—
 Leaf-rachis persisting after fall of leaflets *C. crassicaulis*.
 Leaf-rachis not persisting :—
 Leaflets retuse at apex *C. cuneata*.
 Leaflets rounded at apex *C. acaulis*.

2. *CARAGANA CONFERTA Benth.*

Add to description of *F. B. I.* :—

Pod linear acute, $1\frac{1}{4}$ in. long, $\frac{1}{8}$ in. across, straight, glabrous within, externally sparsely covered with long spreading silky white hairs.

This has recently been collected in a complete state by Mr. Duthie in Astore ; Gudhai valley, 11–12000 ft., *Duthie* n. 12196 !

3. *CARAGANA GERARDIANA Royle.*

Add to localities of *F. B. I.* :—

EASTERN HIMALAYA ; at Ha-thom-py-ong, in Chumbi, *Dr. King's Collectors* !

3b. *CARAGANA CHUMBICA Prain* ; leaflets 8–12, narrowly ovate-lanceolate acute, densely pubescent, stipules pungent, flowers 1–2, short-pedicelled, pod glabrous within.

EASTERN HIMALAYA; Ta-loong, two days from Chumbi, *Dr. King's Collectors!*

A shrub with close nodes, young branches pubescent with long spreading tawny hairs. *Leaflets* $\frac{1}{2}$ in. long, tips pungent, whitish and densely pubescent with long silky hairs beneath, dark-green and sparsely pubescent above; leaf-rachis and lanceolate stipules both pungent-tipped and densely hirsute with long spreading tawny hairs. *Calyx* $\frac{3}{4}$ in. long, externally very thinly grey-puberulous, pedicels $\frac{1}{12}$ in. long only, in axils of small 2-3-jugate leaves, by the sheaths of which they are enclosed; bracteoles 0; calyx-teeth triangular, $\frac{1}{4}$ as long as campanulate tube. *Corolla* twice the calyx. *Pod* $\frac{3}{4}$ in. long, $\frac{1}{2}$ in. wide, glabrous within, sparsely pubescent with spreading silky hairs outside.

A very distinct species resembling in many respects *C. Gerardiana*, but with different tomentum and very different pods.

4. *CARAGANA POLYACANTHA* Royle.

Add to description of *F. B. I.*:—

Pod linear acute, $1\frac{1}{4}$ in. long, $\frac{1}{8}$ in. across, slightly curved; glabrous internally and externally.

Add to distribution:—KASHMIR; Gilgit, *Duthie! Giles!*

4a. *CARAGANA AMBIGUA* Stocks, *Hook. Journ. Bot.* iv. 145; leaflets small, 4-6, elliptic-mucronate, adpressed hoary-pubescent, stipules spinescent, flowers usually solitary on distinct peduncles; pod pubescent oblong, shortly mucronate, distinctly recurved, sharply acuminate. *Boiss. Flor. Orient.* ii. 199. *C. Gerardiana* Herb. *Lace, not of Royle.*

SCINDE; Stocks! BRITISH BELUCHISTAN; near Quetta, *Hamilton!* Ziarat, *Lace* n. 3697 (issued as *C. Gerardiana*)! DISTRIB. Beluchistan (*Stocks!*) S. Afghanistan (*L. O. Rind!*)

A small much branching shrub, with strong spreading spines $1-1\frac{1}{4}$ in. long. *Leaves* $\frac{1}{2}-\frac{2}{3}$ in.; leaflets pale-green $\frac{1}{4}-\frac{1}{3}$ in., leaf-rachises hoary-puberulous. *Peduncle* $\frac{1}{2}$ in., 2-bracteolate close below the calyx (i.e., pedicels very short), pubescent with somewhat spreading hairs. *Calyx* adpressed-hoary, tube wide-campanulate, $\frac{1}{4}$ in. deep, teeth triangular-lanceolate nearly as long as tube. *Corolla* $\frac{3}{4}$ in. long. *Pod* $\frac{3}{4}$ in. long, turgid, $\frac{1}{2}$ in. wide.

This is nearest, as M. Boissier has already suggested, to *C. polyacantha*. A specimen named, and correctly named; *C. ambigua*, by Stocks himself, was sent by him to the Calcutta Herbarium with the locality "Scinde" on the ticket. All Stocks' other specimens, which have reached Calcutta either from Herb. Dalzell or from Herb. Kew, are marked "Beluchistan."

4b. *CARAGANA ULICINA* Stocks, *Hook. Journ. Bot.* iv. 145; leaflets small, 4-6, elliptic-refuse, mucronulate, adpressed hoary-pubescent, stipules spinescent, flowers 1-2 on distinct peduncles; pod pubescent, lanceolate, gradually tapering to apex, quite straight. *Boiss. Flor. Orient.* ii. 199; *Aitch. & Bak. in Journ. Linn. Soc.* xviii. 44.

N.-W. FRONTIER; Kurram Valley, *Aitchison* n. 8! DISTRIB. Beluchistan (*Stocks!*)

A small much branching shrub, with spreading spines rarely exceeding $\frac{1}{2}$ in., usually slightly recurved and always weaker than in the preceding species. *Leaves* $\frac{1}{2}$ in., leaflets pale-green $\frac{1}{4}$ – $\frac{1}{2}$ in., leaf-rachises adpressed-puberulous with very short hairs. *Peduncle* $\frac{1}{2}$ in., 2-bracteolate below the 1–2 slender pedicels, $\frac{1}{4}$ in. long. *Calyx* sparsely adpressed-puberulous, tube wide-campanulate, $\frac{1}{4}$ in. deep, teeth triangular half as long as tube. *Corolla* $\frac{1}{2}$ in. long. *Pod* $\frac{3}{4}$ in. long, not turgid, $\frac{1}{8}$ in. wide.

M. Boissier suggests that this hardly differs from the preceding species; it differs however in spines, in flowers and in fruits so markedly that nothing could be gained by their union. Dr. Aitchison suggests (*Journ. Linn. Soc.* xviii. 43) that both *C. ulicina* and *C. ambigua* are perhaps only forms of an expanded species that would include *C. brevispina*. The writer, on the other hand, finds it necessary to recognise as specifically distinct from both of Stocks' species the plant identified by Dr. Aitchison with *C. ambigua*. The reasons for this will appear in the specific diagnosis and description which follow.

5b. *CARAGANA AITCHISONI* Prain; leaflets 6–8, very rarely 10, elliptic-mucronate, very sparsely adpressed-pubescent, stipules strongly spinous, flowers solitary on a long slender peduncle, pod glabrous linear not woolly within. *C. ambigua* Aitch. *Journ. Linn. Soc.* xviii. 43 *not of Stocks*.

N.-W. FRONTIER; Kurram Valley, Aitchison n. 549! n. 1220! Hazara, Bellew! Chitral, at Broz, Harriss!

A large spiny shrub with greenish *Laburnum*-like bark and short stoutish spreading stipular spines $\frac{1}{4}$ in. long. *Leaves* $\frac{1}{2}$ – $\frac{3}{4}$ in., leaflets pale-green, $\frac{1}{4}$ – $\frac{1}{2}$ in. *Peduncle* very slender, jointed above middle, $\frac{3}{4}$ –1 in. *Calyx* $\frac{1}{4}$ in. long, membranous, wide-tubular, externally sparsely pubescent, teeth short. *Corolla* $\frac{3}{4}$ in., glabrous. *Pod* flat, $1\frac{1}{2}$ in. long, $\frac{1}{8}$ in. across.

This differs very much in pedicels, calyx and pod from the true *C. ambigua*. It is not possible to place it in *C. brevispina*, the calyx and pod are so different. It is nearest to *C. microphylla* Lamk. of which it has almost the calyx and quite the corolla and pods; it differs, however, in having much longer and thinner pedicels and shorter leaves with far fewer leaflets. From *C. arborescens* Lamk. VAR. β . Ledeb. it is best distinguished by its thicker much smaller leaflets, and its compressed not cylindric pods.

5c. *CARAGANA ARBORESCENS* Lamk. *Encyc. Meth.* i. 615; leaflets 8–14, elliptic-mucronate glabrescent, stipules weakly spinous, flowers several together from one node on long slender peduncles, pod glabrous linear not woolly within. *DC. Prodr.* ii. 268; *Ledeb. Flor. Ross.* i. 569; *Aitch. Journ. Linn. Soc.* xviii. 44.

N.-W. FRONTIER; Kurram Valley, Aitchison n. 1219!

A tall shrub with very short weak spreading stipular spines $\frac{1}{8}$ in. long. *Leaves* 1–2 in., leaflets $\frac{1}{2}$ in. by $\frac{1}{4}$ in., pale-green, thinly membranous. *Peduncle* very slender, jointed above middle, $\frac{3}{4}$ –1 in., 2–5 from the same node. *Calyx* $\frac{1}{4}$ in. long, membranous, wide-tubular, externally sparsely pubescent, teeth short. *Corolla* $\frac{3}{4}$ in., glabrous. *Pod* cylindric, $1\frac{1}{2}$ in. long, $\frac{1}{8}$ in. in diam.

7b. *CARAGANA ACAULIS* Bak. in *Journ. Linn. Soc.* xviii. 44; leaflets 7–9, flowers solitary.

N.-W. FRONTIER; Kurram Valley, *Aitchison* n. 1218!

Stemless; leaves rosulate crowning a slender elongated woody rhizome. *Leaflets* sessile obovate-cuneate, $\frac{1}{3}$ – $\frac{2}{3}$ in. long, apex rounded or obtuse, petiole short, stipules small deltoid. *Peduncle* $\frac{1}{2}$ – $\frac{3}{4}$ in. long. *Calyx* $\frac{2}{3}$ – $\frac{3}{4}$ in., downy, teeth lanceolate half as long as tube. *Corolla* 1 in., standard $\frac{1}{2}$ in. wide, silky, dirty-purple externally, yellow within. *Pod* linear, straight, thinly hoary, 18–20-seeded.

24b. CALOPHACA FISCH.

Perennial diffuse unarmed shrubs or undershrubs. *Leaves* odd-pinnate. *Flowers* solitary or umbellate on axillary peduncles. *Calyx* tubular, lobes almost equal or the 2 upper subconnate. *Corolla* exerted standard ovate or suborbicular, erect, margins reflexed; wings obovate-oblong, subfalcate, free; keel incurved about as long as the wings. *Stamens* 2-adelphous; anthers uniform. *Ovary* sessile, many-ovuled; style filiform, stigma small terminal. *Pod* linear, at length round or turgid; seeds subreniform. Species about 8; Oriental and North Asiatic.

1. CALOPHACA DEPRESSA *Oliv.* in *Hook. Icon. Plant.* t. 2304; leaflets 5–9, subalternate, oblong or obovate-elliptic the terminal obovate-cuneate, mucronulate, silky-pubescent; flowers very small solitary; pod turgid-cylindric mucronulate villous, 5–6-seeded.

KASHMIR; Baltistan, 6000 feet, *Giles*: Indus Valley, 7–8000 feet, *Duthie*!

A small depressed shrublet, hoary tomentose in all its parts. *Leaves* $\frac{1}{2}$ –1 in. long, short-petioled; leaflets $\frac{1}{4}$ in. or less with distinct petiolules; stipules small, ovate-lanceolate. *Flowers* on peduncles shorter than the leaves, $\frac{1}{4}$ – $\frac{1}{3}$ in. long. *Calyx*, 3 lower teeth deltoid, 2 upper linear-subulate. *Standard* twice as long as calyx, shortly clawed, rounded, about as long as obtuse keel; wings shortly oblong-obtuse. *Pod* about $\frac{1}{2}$ in. long, $\frac{1}{3}$ in. wide.

25. GULDENSTÆDTIA FISCH.

3. GULDENSTÆDTIA MULTIFLORA *Bunge.*

Add to localities of *F. B. I.*:—BURMA; Shan Hills at Saga, 4000 feet, and Koni, 4500 feet *Collett*!

28. TAVERNIERA DC.

1. TAVERNIERA NUMMULARIA DC.

Add to localities of *F. B. I.*:—CENTRAL INDIA; *Jerdon*! SOUTHERN DECCAN; *Cleghorn*!

The plant appears to be very rare in the dry parts of the Deccan; it has not as yet been reported from Rajputana, where, however, considering the eastward extension just noted, it probably occurs and where it should be looked for.

31. ONOBRYCHIS GÆRTN.

1. ONOBRYCHIS STEWARTII *Bak.*; leaflets oblanceolate, subacute; pod reniform, turgid, 1-seeded; perennial.

2. *ONOBRYCHIS LAXIFLORA* Bak. in *Journ. Linn. Soc.* xix. 159; leaflets elliptic-obtuse 4-8-jugate the terminal not exceeding the lateral; pod circinnate flat semi-orbicular, 1-seeded; perennial.

NORTH-WEST HIMALAYA; Gilgit, *Giles!* DISTRIB. Afghanistan.

Herbaceous, perennial, stems slender $1\frac{1}{2}$ -2 ft., finely puberulous. *Leaf-rachis* 3-6 in. long, including petiole $\frac{1}{2}$ -2 in.; leaflets 9-17, shortly petiolulate, $\frac{1}{3}$ - $\frac{1}{2}$ in. long, pale-green, obscurely canescent; stipules deltoid-acuminate, persistent. *Racemes* long-peduncled, lax, elongated, 6-9 in.; buds rather crowded; bracts minute scarious persistent. *Calyx* campanulate, obscurely pilose, $\frac{1}{8}$ in.; teeth lanceolate as long as tube. *Corolla* 5 times calyx; standard glabrous, veined. *Pod* circinate, flat, semi-orbicular, faces areolate with hexagonal deepish pits, their walls sparingly spinescent; margins armed with numerous small teeth.

3. *ONOBRYCHIS NUMMULARIA* Stocks in *Hook. Journ.* iv. 146; leaflets ovate-orbicular or obovate-obtuse, mucronate; the terminal much exceeding the sometimes abortive lateral; pod circinnate flat, orbicular, 2-seeded; annual. *Boiss. Flor. Orient.* ii. 545. *O. tavernieræfolia* Stocks ex *Boiss. l.c.*

NORTH-WEST FRONTIER; British Beluchistan, very common. DISTRIB. Throughout Beluchistan and Afghanistan.

An annual dwarf stemless herb, hoary-tomentose. *Leaf-rachis*, including very long petiole, 4-5 in., leaflets 3 or 5, or very often only the terminal present; terminal $\frac{1}{2}$ - $1\frac{1}{4}$ in. in diam. the others rarely exceeding $\frac{1}{3}$ in., densely tomentose. *Racemes* long-peduncled, 6-8 in. long, rather lax, usually slightly exceeding the leaves; pedicels short, bracts rather long, $\frac{1}{3}$ in., subulate. *Calyx* hirsute externally, including teeth $\frac{1}{5}$ in., teeth subulate from broad bases twice as long as the short wide-campanulate tube. *Corolla* twice as long as calyx, under $\frac{1}{2}$ in., standard puberulous, veined. *Pod* orbicular 2-locular, faces areolate with radiating pits, their walls little raised, unarmed; margins beset with long cottony setae.

Nearly related to the Persian *O. Aucheri* Boiss., but differing by its 2-seeded pods. The two species recognised by M. Boissier were by Dr. Stocks himself latterly supposed to be only two varieties of one species. The writer finds too many intermediates in Herb. Calcutta to admit of his even separating them as varieties.

32. *LESPEDEZA MICHX.*

SUBGEN. I. *EULESPEDEZA.*

1. *LESPEDEZA SERICEA* Mig.

Add to localities of *F. B. I.*:—Mountains of BEHAR and CENT. INDIA; very common. RAJPUTANA; Mt. Abu, common. UPPER BURMA; common.

A very distinct variety with long petioled leaves, var. *longepetiolata*, has recently been collected in Upper Assam (Makûn), by Mr. G. Gammie. This variety is common in South-West China.

6b. *LESPEDEZA SERICOPHYLLA* Coll. & Hemsl. *Journ. Linn. Soc.* xxviii. 45; petiole distinct, leaves rather large, densely silvery-tomentose on both sides, calyx densely hirsute with long hairs.

UPPER BURMA ; Shan Hills at Toungyi, 5000 feet elev., *Collett !*

A rather large shrub, the flowering branches thickish, angular, adpressed-silky. *Leaves* pinnately 3-foliolate, silvery-sericeous everywhere, shortly petiolulate, rachis and petiole 1-1·5 in. long ; leaflets thick, soft, elliptic, terminal 1·25-1·75 in. long, ·75-1 in. wide, lateral pair rather smaller. *Flowers* ·5 in. long, in dense racemes, pedicels shorter than calyx, bracts small persistent. *Calyx* ·2 in. long, sub-2-labiate, lobes narrow acute, the two upper almost completely connate, everywhere softly hirsute. *Petals* subequal glabrous ; standard broad, claw very short ; wings oblong, claw long slender ; keel 2-auriculate above the long, slender claw ; long-beaked. *Stamens* 2-adelphous. *Ovary* shortly stipitate, bearded along the upper suture, elsewhere glabrous. *Pod* not seen.

6c. *LESPEDA PINETORUM* Kurz, *Journ. As. Soc. Beng.* xlii. 2. 230 ; petiole distinct, leaflets large ovate-lanceolate acute softly velvety above, densely softly tomentose beneath, flowers is very dense sessile racemes, pod sessile hardly exerted.

BURMA ; Nattoung Mts., *Revd. Cross !* Pegu, Bookee Ridges, 4-6000 feet, Kurz 1637 ! TENASSERIM ; Moolyet Range, common, *Gallatly !*

A stout erect simple or branching shrub 2-4 feet high ; all parts densely tawny-pubescent. *Leaves* 3-foliolate, petiole ·6-·8 in. hardly produced, densely villous ; leaflets very shortly and stoutly petiolulate, 2-3·5 in. long, 1-1·25 in. wide, base cuneate or rounded, tip mucronulate, coriaceous, subrugose under the soft velvety pubescence, prominently nerved and everywhere softly tomentose beneath. *Flowers* ·35 in. long, in very dense racemes 1·5-3 in. long, ·7 in. across, pedicels shorter than the calyx, bracts small persistent. *Calyx* ·2 in. long, sub-2-labiate, lobes subulate, everywhere softly hirsute. *Petals* subequal glabrous, standard broad. *Pod* dimidiate-ovate, ·25 in. long, silky.

A very fine and very distinct species.

SUBGEN. II. *MICROLESPEDA* Maxim. *Keel* transverse obtuse, flowers often apetalous, 1-3 fasciculate, axillary. Small annuals.

6d. *LESPEDA STRIATA* Hook. & Arn. *Bot. Voy. Beech.* 262 ; herbaceous, rigid, suberect, stems hoary, stipules longer than petiole, leaflets cuneate-oblong or obovate, obtuse or retuse, mucronulate, margin ciliate, veins numerous parallel, flowers axillary 1-3, shortly pedicelled, corolla when present twice the calyx ; pod in perfect flowers slightly, in apetalous flowers far exerted. *Miq. Prol. Fl. Japon.* 237 ; Maxim. *Synops. Laped.* 56 ; *Benth. Pl. Hong-Kong.* 85. L. stipulacea Maxim. *Prim. Fl. Amur.* 85, 470 ; *Schmidt, Fl. Sachal.* 124. *Hedysarum striatum* Thunb. *Fl. Japon.* 289.

KHASIA ; common, Mann ! *Clarke* nn. 18604 ! 40531 ! 45227 ! **DIS-TRIB.** China ; Corea ; Mandschuria ; Japan ; Saghalien ; Bonin.

An annual herb 3-15 in. high, somewhat branched. *Stipules* striate, adpressed. *Leaflets* shortly petiolulate, rigid, midrib beneath adpressed-strigose, elsewhere glabrous except the ciliate margins, ·35 in. long. *Bracteoles* 2, ovate, striate, ciliate, adpressed to calyx-base. *Calyx* narrowly campanulate, striate subangled plicate, 5-fid, teeth almost equalling tube, the two upper narrower and rather shorter than

the lower. *Petals* when present twice as long as calyx, subequal; standard obovate emarginate; wings linear-oblong; keel obtuse. *Pod* rounded.

An exceedingly distinct species, ascertained during recent years to be quite common in the Khasia Hills.

SUBGEN. III. OXYRAMPHIS *Wall.* (*Campylotropis Bunge; Maxim.*)

7. LESPEDEZA MACROSTYLA *Bak. in Maxim. Synops. Lesped.* 22 *in part.* Delete from synonyms of *F. B. I.*:—*L. Royleana* *Miq. Ann. Mus. Lugd. Bat.* iii. 50 (*L. sericea* *Royle not of Miq.*); also *Oxyramphis stenocarpa Klotzsch in Reis. Pr. Wald.* 158 t. i. fig. 2, (*O. sericea* *Grah. in Wall. Cat.* 5349).

Delete all localities except NEPAL; *Wallich* (Cat. n. 5348)!

7b. LESPEDEZA STENOCARPA *Maxim. Synops. Lesped.* 23. *L. Royleana* *Miq. Prol. Fl. Jap.* 238. *L. sericea* *Royle MSS. not of Miq.* *Oxyramphis stenocarpa Klotzsch, Reis. Pr. Wald.* 151, t. I, fig. 2. *O. sericea* *Grah. in Wall. Cat.* 5349.

N.-W. HIMALAYA; Kamaon and Garhwal, very common, *Govan* (*Wall. Cat.* 5349/B)! *Wallich* 5349/A! *Royle! Griffith! Thomson! Anderson! King! Gamble! Lace! Hume! Stoliczka!*

To Mr. Maximowicz Indian botanists are indebted for having pointed out that the Nepalese plant (*L. macrostyla*) is very different from the representative form in Kamaon and Garhwal (*L. stenocarpa*); the two are easily distinguished by their pods, those of *L. stenocarpa* being grey-silky, narrowly oblong, and gradually tapering upwards to the base of the style, while those of *L. macrostyla* are shortly broadly ovate, abruptly rounded at the apex whence the long style arises, and are tawny-pubescent. The leaves too of *L. macrostyla* are only sparsely tomentose beneath, those of *L. stenocarpa* are densely so.

Mr. Maximowicz refers, in part, to *L. stenocarpa* another plant that occurs in the North-West Himalaya, of which *Falconer* n. 443 K. D. is an example. In this, however, he is certainly in error, for *Falconer* n. 443 includes two plants that cannot be referred either to *L. macrostyla* or to *L. stenocarpa* but which are much more closely related to *L. eriocarpa*; one of them indeed is that species.

The *F. B. I.* gives Khasia as a locality of *L. macrostyla* in the sense which incorporates the two preceding species. No botanist has, however, hitherto sent either *L. macrostyla* or *L. stenocarpa* to Calcutta from the Khasia Hills.

8. LESPEDEZA ERIOCARPA *DC.*

VAR. *Falconeri* *Prain*; petiole hardly produced, leaflets smaller ovate-acute, pods (young) more softly tomentose; habit spreading as in "*L. paniculata* *Royle.*" *L. macrostyla* *Maxim. in part, not of Bak.*

GARHWAL; *Falconer* n. 443 K. D. (flowering specimens only)! SIMLA; Elysium Hill, *Gamble* 4968!

The fruiting portion of the sheet of *Falconer's* collection quoted is only *L. paniculata* *Royle*, which Mr. Baker very justly has reduced to *L. eriocarpa*. The plant represented by the flowering specimens will, in all probability, when more fully known have to be recognised as a species apart, *L. Falconeri*.

8b. *LESPEDEZA BICOLOR* Turcz. in *Bull. Soc. Mosc.* (1840) 69; petiole produced, leaflets sparsely adpressed-puberulous beneath, stipules subulate, calyx and small subincluded pod very sparsely adpressed-hairy. *Ledeb. Flor. Ross.* i. 715; *Maxim. Synops. Lesped.* 29. *Desmodium racemosum* Sieb. & Zucc. *Fl. Jap. Fam. Nat.* i. 121 not of DC.

NORTH-WEST HIMALAYA; Black Mountain, 6-9000 feet, *Duthie* 7460! Hazara; Dohar, etc., in the Kagan Valley, *Duthie's Collector* 19308! 19309! *DISTRIB.* Siberia, China, Japan.

A copiously branched erect shrub, with slender virgate rounded branchlets, adpressed-puberulous or glabrous. *Petioles* .5-1.5 in. long; leaflets ovate-rotund, membranous, obtuse or emarginate, with a slender terminal mucro; green, glabrous, reticulate-venose above, glabrous or sparsely adpressed-puberulous beneath, the stipules slender subulate. *Racemes* axillary many-fl. lax, much exceeding the leaves, bracts and bracteoles minute; pedicels $\frac{1}{6}$ in. *Calyx* $\frac{1}{6}$ in., teeth ovate or lanceolate, obtuse or acute. *Corolla* purple, .35 in. long. *Pod* .25 in. long, rounded-elliptic, mucronate, reticulate.

9b. *LESPEDEZA PRAINII* Coll. & Hemsl. in *Journ. Linn. Soc.* xxviii. 46; petiole produced, leaflets large minutely strigillose beneath, calyx glabrescent, pod quite glabrous.

BURMA; Shan Hills, 4-5000 feet, *Collett! King's Collector!*

A handsome shrub, 10 feet high, branchlets slender, striate, puberulous, at length glabrescent, internodes abbreviated. *Leaves* pinnately 3-foliate, petiole very slender 1 in. long, stipules persistent, narrow-lanceolate, .25 in. long, leaflets shortly petiolulate, terminal .5-1 in. long, rather exceeding lateral, thin submembranous, obovate with rounded apiculate tips and cuneate bases, dark-green glabrous above, paler strigillose beneath; stipels obsolete. *Flowers* purple, .5-6 in. long, in dense, axillary racemes longer than the leaves with slender peduncles and capillary pedicels exceeding the calyx. *Calyx* glabrescent, lobes 5, ovate-acute. *Petals* glabrous subequal. *Pod* shortly stipitate, ovate-oblong, .4-.5 in. long, glabrous, reticulate.

A very handsome species, nearest to *L. macrocarpa* Bunge, from China, which has, however, a ciliate pod.

10. *LESPEDEZA DECORA* Kurz.

Add to synonyms of *F. B. I.*:—*Desmodium angulatum* Wall. *Cat.* 5729 in part (*letter I only*).

This species is very common in the Shan States and in Tenasserim.

11. *LESPEDEZA PARVIFLORA* Kurz.

Also very common throughout the Shan Plateau.

33. *ALHAGI* DESV.

1. *ALHAGI CAMELORUM* Fisch. *Ind. Hort. Gorenk.* ed. ii. 72 (1812); *Boiss. Flor. Orient.* ii. 559. *A. maurorum* Bak. in *Flor. Brit. Ind.* ii. 145 *vix Tournef.*

The *Flora of British India* adopts the view, suggested by Bentham and Hecker, that the various forms of *Alhagi* should be reduced to a single species. After a care-

ful analysis of examples of all the forms hitherto reported, the writer feels unable to accept this extreme view. He cannot, however, quite follow Mr. Boissier, *l.c.*, in keeping *A. graecorum* Boiss. as a species apart from *A. maurorum* and would propose the recognition in the genus of only two species, *viz.* :—

1. *A. maurorum* Tournef. Cor. 54; DC. Prodr. ii. 352; ovaries silky.

2. *A. camelorum* Fisch. *l.c.*; ovaries quite glabrous.

The name given by Desvaux to the first-named species was *A. mannifera*; he did not anywhere use the name cited in the *Flora of British India*.

All our Indian specimens of *Alhagi* have glabrous ovaries and hence belong to the second species; those from the Panjab, North-West Frontier and North-West Himalaya are indistinguishable from the Persian and Armenian species of *A. camelorum*, while curiously many of those from Rajputana have the broader leaves characteristic of the form from Turkestan and Soongaria which Schrenk proposed to recognise as a species under the name *A. Kirghisorum*.

34. HEDYSARUM LINN.

6. HEDYSARUM SIBIRICUM Poir. *Encyc. Meth. Suppl.* v. 17.

Specimens of this species grown in the Imperial Garden, St. Petersburg, as well as others collected by Turczaninov and named by Dr. Regel, are indistinguishable from the plant named *H. laxiflorum* by Mr. Benth.

38. SMITHIA AIT.

1. SMITHIA SENSITIVA Ait.

Add to localities of *F. B. I.* :—ANDAMANS and NICOBARS; common, but only in the convict settlements, and evidently a recently introduced weed.

1b. *SMITHIA FLAVA* Dalz. *MSS.*; stems not bristly, leaflets small, 16–20; flowers in short simple racemes, calyx-lips equal, corolla yellow; flowers much larger than in *S. sensitiva*. *S. sensitiva* var. *flore majore* *Herb. Ind. Or. H. f. & T.*

WESTERN INDIA; Concan, *Law!* *Stocks!* Canara, in damp rice fields *Talbot* n. 257!

General habit of *S. sensitiva*, but with much stouter sparingly branched stems and very much larger flowers.

This is only accorded specific rank because *S. javanica* Benth., from Java and Sumatra, which has corolla and pods very like those of *S. sensitiva* and mainly differs in having no bristles on the calyx and bracts, is so recognised.

5. SMITHIA BIGEMINA Dalz.

Add to localities of *F. B. I.* :—SCINDE; *Stocks!* RAJPUTANA; on Mt. Abu, very common, *King!* *Duthie* n. 6627!

7. SMITHIA CILIATA Royle.

Add to localities of *F. B. I.* :—NAGA HILLS; Kohima, *Clarke* n. 41705! BURMA; Pegu, Bookee ridges, *Kurz* n. 1633! *DISTRIB.* Formosa (*Henry* n. 1521!)

10. *SMITHIA SALSUGINEA* Hance, *Journ. Bot.* vii. 164 (1869). *S. dichotoma* Dalz. ex Bak., in *Flor. Brit. Ind.* ii. 150 (1876).

Add to localities of *F. B. I.*:—BURMA; Arracan, amongst high grass along the sea-shores opposite Akyab, *Kurz!* DISTRIB. China.

Dalzell's name, though proposed for the plant many years before Hance's, was unfortunately not published till seven years later.

11. *SMITHIA GRANDIS Benth.*

This species is not confined to Sikkim, it has been collected in Bhūtan by Parkes, in Assam by Fisher (where it was also collected 45 years ago by Simons), at the foot of the Akha Hills by one of Dr. King's collectors, and in the lower Khasia Hills by Mr. G. Mann and Mr. C. B. Clarke. Dr. Griffith's specimens, it now appears, came also from Assam, not from Sikkim.

12. *SMITHIA BLANDA Wall.*

VAR. 3. *humilis* Prain; annual, stems slender short, leaflets as in VAR. *racemosa*; corymbs rather lax, calyx $\frac{1}{4}$ in., corolla $\frac{2}{3}$ – $\frac{3}{4}$ in. much larger than in any of the other varieties or than in the type. *S. hirsuta* Dalz. in *Kew. Journ.* iii. 135, not of Bak. *S. humilis Benth. MSS.* in *Herb. Ind. Or. H. f. & T.*

WESTERN GHATS; at Mahableshwar, *Cooke!* Canara, *Talbot* n. 626! CONCAN; *Stocks!* *Gibson!*

40. ORMOCARPUM BEAUV.

2. ORMOCARPUM GLABRUM *Teyss. & Binnend., Nat. Tijds. Ned. Ind.* xxvii. 56; pod 6-7-jointed; joints oblong, thrice as long as broad, plicate smooth.

ANDAMANS; common, probably only as an escape from cultivation.

General habit of *O. sennoides*, of which it seems to be only a cultivated form; the pods are, however, much longer, sometimes 6 in long, with larger joints which are never muricated. It must not be overlooked that the original description of this form was drawn up from cultivated specimens.

46. URARIA DESV.

* *Upper leaves 5-9-foliolate.*

2b. URARIA ACUMINATA *Kurz, Journ. As. Soc. Beng.* xlv. pt. 2, 235, 236; leaflets linear-lanceolate, glaucous-green not clouded, sharply acuminate; pedicels clothed with long bristles; joints of pod opaque and covered with a short sparse pubescence.

BURMA; Pegu, Tonkyeghat, *Kurz* n. 1645! Shan Hills, Makhoye, *King's Collector!* Madoe, *King's Collector!*

General habit of both *U. picta* and *U. crinita*, but abundantly distinct from both in the nature of its foliage, the leaflets beneath having, as *Kurz* remarks, a very thin and lax net-venation.

In the *Index Kewensis*, *U. acuminata* is doubtfully referred to *U. picta*, a suggestion that would never have been made had specimens been available for comparison. The leaves, except for being narrowly sharply acuminate, have indeed much the

shape of those of *U. picta*, but have a very different venation, and are of somewhat different texture. The pods, however, which Mr. Kurz has described in a rather misleading manner, and the pedicels, are exactly like those of *U. crinita*; if it be necessary to reduce Mr. Kurz's species to another it must be to *U. crinita* not to *U. picta* that it should be referred. But in the light of the ample material recently received, it seems clear to the writer that either reduction would be unjustifiable.

2c. *URARIA MACROSTACHYA* Wall. *Pl. As. Rar.* ii. t. 110; leaflets broadly ovate, subacute, not clouded; pedicels clothed with long soft spreading hairs; joints of pod straw-coloured dimpled shining, perfectly glabrous. *Wall. Cat.* 5675 I.

UPPER BURMA: Hills south of Kyali, *Prazer!* TENASSERIM: Endine Ghor, *Gallatly!* *DISTRIB.* China, whence seeds were sent to Dr. Wallich.

General habit of the three other species of the group. Leaflets 7-8 in. long by 3 in. across, with the thin texture and wide venation of those of *U. acuminata*.

Dr. Wallich, when he first obtained seeds of this plant, supposed it to be a distinct species and had it figured for the *Pl. As. Rar.* as *U. macrostachya*. Subsequently he obtained from Silhet very fine specimens of *U. crinita*, and came to the conclusion (see his note on *Wall. Cat. Lith.* n. 5675 D. and his remarks in the text of *Pl. As. Rar.* ii. 8) that his *U. macrostachya* was the same as *U. crinita*; his Chinese plant (*Cat.* 5675 I.) he therefore subsequently issued as *U. crinita* var. *macrostachya*. It is worthy of remark that his Calcutta Garden specimens were all gathered without any of them being permitted to set their fruits, and most unfortunately Dr. Wallich has allowed himself to add as the fruit of the plant delineated on t. 110, a figure obviously derived from his Silhet specimens. In August 1835, he again sowed seeds sent him from China by Mr. Deard in January of that year; these flowered and fruited in Nov. 1836, and so for the first time it became possible to see that his reduction of his *U. macrostachya* to *U. crinita* was altogether unnecessary. And although in the *Index Kewensis*, Dr. Wallich's erroneous identification has been followed, it will be noticed that the *Flora of British India* has omitted the *Pl. As. Rariores* citation. As there was then no evidence that *U. macrostachya* was an Indian plant, Mr. Baker does not quote the species at all; its recent discovery both in Upper Burma and in Tenasserim renders it now necessary to supply a diagnosis.

* * *Leaves 1- and 3-foliolate intermixed.*

3. *URARIA LAGOPOIDES* DC.

This species is very easily recognised owing to its having been founded on the excellent figure by Burmann—nor is there now any doubt that the *Hedysarum lagopodioides* of Linnaeus is the same, excellent Chinese specimens agreeing in every respect with the Indian plant having recently been sent from Hainan by Dr. Henry. Dr. Roxburgh's coloured drawing at Calcutta and Kew is an excellent representation also.

The species extends from Bengal and Assam throughout Indo-China to South China on the one hand and to the Nicobars (where it was collected by Mr. Kurz) and the Malay Archipelago on the other. In Burma it is remarkably common, and the flowers are there as often white or yellow as they are pink. For the plant, as it occurs in Java, Dr. Otto Kuntze has proposed the varietal name "*rhomboidea*;"

there are some rhomboid leaflets on nearly every plant. This is Dr. Wallich's *Uraria retusa* in its entirety; Mr. Baker says that it forms part of Dr. Wallich's *U. hamosa* also, which may well be the case, for evidently Dr. Wallich misunderstood those Indian species, as elaborated by Dr. Roxburgh, of *Hedysarum* (or *Doodia*, as Roxburgh afterwards called them), that constitute the genus *Uraria*. The writer has not, however, seen an instance of this particular confusion among the Wallichian specimens.

To this species the most nearly related *Uraria* is *U. alopecuroides* Wight, (*Doodia alopecuroides* Roxb.), which differs in having a stouter habit, rather larger racemes with broader more shortly tailed bracts, and larger differently shaped clouded leaves. Wight and Arnott (*Prodr.* 222) have suggested that *U. alopecuroides* may be the same as *U. lagopoides* Wall., which is impossible, because *U. lagopoides* Wall. is certainly *U. lagopus* DC.; in this Wight and Arnott have been followed by the *F. B. I.*

4. URARIA LAGOPUS DC.

This species has been confused with the preceding by Dr. Wallich who issued it as *U. lagopoides* Wall. Cat. n. 5676 E. from Nepal and n. 5676 F. from Silhet, and still more hopelessly with the next two species by practically every Indian author who has dealt with the genus. The confusion is, as it chances, devoid of excuse since this is the most easily characterised species of its own group, owing to its having hirsute pods, those of *U. lagopoides*, *U. alopecuroides* and *U. neglecta* being quite glabrous.

From the synonyms given in the *Flora of British India* must be excluded *U. alopecuroides* Wight, (*Ic. t.* 290) regarding which no mistake is possible because it is a copy of Roxburgh's manuscript drawing; also *Doodia alopecuroides* Roxb. (*Fl. Ind.* iii. 368) which is the description of the plant there delineated, and *Hedysarum alopecuroides* Roxb. (*Hort. Beng.* 57), the earliest reference to the plant in question. The *F. B. I.* has referred here also a part of *Uraria hamosa* Wall., since it has identified Wall. Cat. n. 5681 C. with *U. lagopus*. This is not, however, possible; Wall. Cat. 5681 C. has glabrous pods with 3-6 segments, the segments being much smaller than those of *U. lagopus*.

The *F. B. I.* locates the species in Burma; no specimens from Burma have ever been received at Calcutta. Specimens have, however, been sent from the Chumbi Valley, the plant consequently occurs at a considerably higher level than the *F. B. I.* indicates.

5. URARIA ALOPECUROIDES Wight, *Ic. t.* 290. *U. repanda* Wall. Cat. 5677.

This is Dr. Roxburgh's *Doodia alopecuroides*. Just as Dr. Wallich failed to recognise Roxburgh's *D. lagopodioides*, to which he gave the name *U. retusa*, so he failed to recognise *D. alopecuroides* and issued it as *U. repanda*. The plant is perhaps not specifically distinct from *U. lagopoides*; it certainly can never be referred to *U. lagopus*, for though it has the erect habit of the latter instead of the trailing habit of *U. lagopoides*, its bracts differ but slightly and its calyx, corolla, and pods do not differ at all from those of *U. lagopoides*.

The localities of the species are :—

Dehra Dun; Vicary! Behar; Kurz! Anderson! Wood! Clarke! Khasia Hills; G. Mann! Burma; Wallich! King's Collector! It probably came originally from Dehra Dun to Dr. Roxburgh; it was one of the species of which he received seeds from Genl. Hardwicke—these, as we know now, came mostly from the Sub-Himalayan tract. This species has not been collected in the Himalaya.

Wallich's name has been deliberately abandoned, partly because by so doing it is possible to conserve the oldest trivial epithet, under which Dr. Roxburgh characterised the plant more accurately than any subsequent author has been able to, but mainly because it is only by so doing that one can emphasise the need there is for a thorough change in our conception of the species of *Uraria*.

5b. *URARIA NEGLECTA* Prain; stems erect, leaflets large oblong not cordate, racemes long dense cylindrical, lower calyx-teeth subequal. *Uraria lagopodioides* Wall. in part (Cat. 5675). *U. hamosa* Wall. in part (Cat. 5681 C.) *U. lagopoides* Royle, Ill. Him. Pl. t. 33, f. 1. *U. lagopus* Royle, Ill. Him. Pl. 201; Bak. in Flor. Brit. Ind. ii. 156 in part, not of DC.

KAMAON; *Blinkworth!* Vicary! King! Duthie! Gamble! Kangra, *Stolicka!* Darmsala, Clarke! DUARS; *Heawood!* ASSAM; *Masters!* BENGAL; *Kurz!* Clarke! MISHMI; *Griffith!*

Branches woody slender shortly pubescent. Leaves as in *U. hamosa*. Racemes exactly as in *U. lagopus* but with bracts quite as in *U. hamosa*; pedicels 2-3 times the calyx, densely crinite. Calyx $\frac{1}{6}$ - $\frac{1}{8}$ in. Corolla purple, little exserted. Joints 2-6, pale to lead-coloured polished.

This is in reality one of the best characterised species in this troublesome genus. Its characters, as the above description shows, make it intermediate between *U. lagopus* of which it has the inflorescence, and *U. hamosa* of which it has the bracts and foliage. It agrees, as a matter of fact, in many more points with *U. hamosa*, with which Dr. Wallich wished to associate it, than with *U. lagopus* to which it has been referred by subsequent botanists. The pods are more like those of *U. hamosa* than those of *U. lagopus*, but they are glabrous, whereas in both these species the pods are hirsute. Dr. Royle has figured the plant as *U. lagopoides*, and in the text has referred it, equally erroneously, to *U. lagopus*; the F. B. I. account of the genus omits all reference to Royle's names or plate.

6. *URARIA HAMOSA* Wall.

This is *Doodia hamosa* Roxb. As in the case of *D. lagopodioides* which, not recognising it, Wallich issued as *U. retusa* and *D. alopecuroides* which, not recognising it, he issued as *U. repanda*, so, not recognising *D. hamosa*, Wallich issued it as *U. leptostachya*. And just as Wallich mistook *U. lagopus* for *U. lagopoides*, so he mistook the species just described as *U. neglecta* for *U. hamosa*. By a happy accident, however, he did not always recognise his own *U. leptostachya*, and as he has chanced to issue one gathering of it (his Cat. n. 5681 B.) along with the plant that he supposed to be *U. hamosa*, Dr. Wight and after him Mr. Baker, have been able to employ this name and thus to conserve Roxburgh's trivial epithet for the species.

Wight and Arnott in their *Prodr.* 222 have not made any observation on the Wallichian confusion, the detection and elucidation of which we owe to Mr. Baker.

To the synonyms of *U. hamosa* should be added *Doodia simplicifolia* Roxb. from Chittagong which is a state of this species with leaves simple and acute at the apex, as they often are, instead of obtuse; also *Uraria lagopus* var. *polysperma* O. Kuntze, a reduction that it would have been impossible to suggest, so different is this plant from *U. lagopus*, were not authentic specimens of Kuntze's n. 6520, so named, before the writer.

6b. *URARIA PANICULATA* Clarke, *Journ. Linn. Soc.* xxv. 15, t. 4; stems erect, leaflets large narrow-ovate, acute, mucronate; racemes laxly paniculate, lower calyx-teeth not elongated.

NAGA HILLS; Kohima, 3000 feet, Clarke n. 40924!

Stems 3-6 feet high, small twigs and racemes covered with long spreading hairs brown below and with white tips, scattered in a close brown short tomentum; petioles 2 in. long densely-brown tomentose, leaflets 4-6 in. long, $2\frac{1}{2}$ -3 in. across, green and very sparsely hairy above, paler beneath more closely covered with brown hairs on midrib and veins, white over the interspaces. Racemes a foot long, nearly as wide, much branched laterally; bracts ovate-acute, externally brown-tomentose. Calyx $\frac{1}{2}$ in., much as in *U. hamosa*. Corolla 2-3 times the calyx, rose-purple. Joints 5-6, black, pod completely exserted, with a few hairs on the sutures, otherwise glabrous, reticulated.

This is an extremely distinct species, nearest perhaps, as Mr. Clarke says, to *U. hamosa* but differing in the points that he notes. Its most striking peculiarity, which it shares with the next two species, is that its pods are far exserted.

6c. *URARIA GRACILIS* Prain; stems erect, leaflets small ovate-oblong, racemes laxly paniculate, lower calyx-teeth not elongated.

BURMA; Sagaing, Dr. King's Collectors!

Branches woody, very slender, shortly pubescent. Leaves very like those of *U. hamosa*, terminal leaflet $1\frac{1}{2}$ in. long, $\frac{3}{4}$ in. wide, base truncate, apice retuse mucronate. Racemes axillary and terminal, all laxly paniculate; bracts very small ovate-acute, externally sparsely puberulous as is the calyx. Calyx $\frac{1}{2}$ in., as in *U. hamosa*. Corolla 2-3 times the calyx, purple. Joints 4-6, black, puberulous, pod quite exserted as in *U. paniculata*.

Very like *U. hamosa*, but more slender than that species usually is and with very different, much smaller, not cuspidate bracts, also with different pods. In its lax inflorescence it resembles *U. paniculata*; this it likewise does in having exserted pods, but it is a much smaller plant with different tomentum and very different leaves and bracts.

* * * Leaves usually all 1-foliate.

7b. *URARIA LATIFOLIA* Prain; stems erect, leaflets orbicular cordate at base, apex subacute or acute, racemes simple close cylindric.

BURMA; Fort Stedman, King's Collectors!

Branches stout woody, densely clothed with short spreading hairs. Leaves 5 in. in diam. shortly hairy on the raised veins below, secondary nervation very prominent; petiole $1\frac{1}{2}$ -2 in. Racemes terminal only, dense, 4-8 in. long; bracts narrow ovate-acuminate; pedicels $\frac{1}{4}$ - $\frac{3}{8}$ in., abruptly recurved at tip after flowering. Corolla white, exserted. Joints of pod 2-3, black, pubescent with short straight hairs.

The leaves of this species much resemble those of *U. cordifolia* for which at first sight it might be mistaken, especially as the flowers are white as in that species. But the inflorescence and bracts are totally different as are the pods which are more like those of *U. crinita* and *U. acuminata*.

7c. *URARIA COLLETTII* Prain; stems erect, leaflets orbicular cordate at base, apex subacute or acute, racemes copiously panicled.

BURMA; Pinmona, in forest, *Collett! King's Collector!*

Branches stout woody, densely clothed with short spreading hairs. *Leaves* 5 in. in diam., shortly hairy on the raised nerves beneath, secondary nervation very prominent, petiole $1\frac{1}{2}$ –2 in. *Racemes* 4–6 in. long forming copious terminal panicles with densely pubescent peduncles, bracts ovate-cuspidate pubescent, pedicels $\frac{1}{4}$ – $\frac{3}{8}$ in., densely crinite. *Calyx* $\frac{1}{4}$ – $\frac{1}{2}$ in., teeth setaceous nearly equal. *Corolla* slightly exerted. *Joints* of pod 2–4, pubescent with short straight hairs.

This combines the leaves of the preceding with the panicles and bracts of *Lourea campanulata*; like *U. latifolia* it is very nearly related to *U. cordifolia*, all three having very similar flowers. In *U. cordifolia*, however, the bracts are very different being narrowly lanceolate, and the inflorescence though paniculate is subdigitately so as in *U. hamosa* not laxly so as in *Lourea campanulata* and *Uraria Collettii*.

47. ALYSICARPUS NECK.

2. ALYSICARPUS HAMOSUS *Edgew.*

Add to synonyms:—*Hedysarum procumbens* *Roxb. Hort. Beng.* 56; *Flor. Ind.* iii. 345.

The identity of this species with Roxburgh's *H. procumbens* has been overlooked in the *F. B. I.*; in the *Index Kewensis* Roxburgh's species is given as a synonym of *Desmodium retroflexum* which it does not much resemble.

6. ALYSICARPUS RUGOSUS *DC.*

At first sight it seems hardly possible to think that *Alysicarpus rugosus* and its *var. styracifolius* *Bak.* can be conspecific, but a very careful examination of the large suites of specimens at Calcutta shows that Mr. Baker's treatment of this species is amply justified. It is however necessary in the writer's opinion to recognise two other well-marked varieties besides those defined by Mr. Baker. These are:—

VAR. 4. minor; dwarf, diffuse, stems and leaves below glabrous, leaflets small oblong, ovate, or orbicular, obtuse or subacute, racemes short dense, bracts and calyx glabrous.

N. W. HIMALAYA; *Griffith!* PANJAB; Pathankote, *Clarke n. 22006!* RAJPUTANA; Abu, *King!* KATTIAWAR; Rajkote, *McNaghten!* WESTERN INDIA; *Gibson!* BENGAL; Lohardugga, *Clarke n. 33937!* Seebpore, *Kurz!* ASSAM; Nowgong, *Simons!* BURMA; Shan States, *King's Collector!*

This variety combines the habit of *var. styracifolius* with the glabrous leaves and stems, and the inflorescence of the true *A. rugosus*. It has been identified with *var. Heyneanus* by Mr. Kurz, but it has not the hirsute leaves and stems, nor has it the elongated racemes of that form; it has been referred to *var. styracifolius* by Mr. Clarke in which it is equally difficult to place it. It does not occur among Dr. Wallich's specimens at Calcutta.

VAR. 5. pilifer; ascending, stems and leaves below finely pubescent, leaflets lanceolate, racemes short dense, calyx conspicuously ciliated. *A. pilifer* *Wall. Cat.* 5675. *A. scariosus* *Herb. Ind. Or. H. f. & T. viz Grah.*

S. INDIA; *Wall. Cat.* 5675! *G. Thomson!* BURMA; Shan Hills, *King's Collector!*

This combines the habit of true *A. rugosus* with the inflorescence, etc., of *var. styracifolius*, and the recent communication of a large suite of specimens from

Burma with all the characters of the South Indian plant originally differentiated by Dr. Wallich, makes it more satisfactory to give the form varietal rank because its inclusion in *VAR. styracifolius* somewhat mars the symmetry of an otherwise very well characterised form; the establishment of this variety obviously involves the deletion of the synonym *A. pilifer* under Mr. Baker's *VAR. styracifolius*. It should be added moreover that Dr. King's Collectors note the corollas as yellow in this variety, all the others are noted as having them purple.

* * * *DESMODIASTRUM*. *Calyx* much longer than the first joint of the pod, its teeth not imbricated in the fruiting stage. *Pods* as in *Desmodium*.

9. *ALYSICARPUS BELGAUMENSIS* Wight.

10. *ALYSICARPUS RACEMOSUS* Benth.

This is reduced, in the *F. B. I.*, to *A. belgaumensis*. It is, however, impossible to confound the two plants, their pods being remarkably different and no intermediates occurring; and there is hardly a doubt that Mr. Bentham was justified in giving the present one specific rank. There is, however, very considerable difficulty in separating this species from the two plants named by Dalzell *Alysicarpus parviflorus* and *A. rotundifolius*, both of which the *F. B. I.* has transferred to *Desmodium*. That these two are congeneric with *Alysicarpus racemosus* admits of no doubt; the question whether, with Mr. Baker, we are to treat *A. parviflorus* and *A. rotundifolius* as *Desmodia* or, with Mr. Dalzell, to treat them as *Alysicarpi* is one that may be answered with much reason either way. But wherever these two are placed, *A. belgaumensis* and *A. racemosus* must accompany them. Compromises in taxonomy are necessary, indeed the systematic arrangement of species is essentially the art of happy compromise. But an arrangement which places one half of a natural group of forms in one genus, the other half in a second, strains unduly the privileges that the art of compromise allows.

11. *ALYSICARPUS PARVIFLORUS* Dalz. in *Hook. Kew Journ.* iii. 211.
Desmodium parviflorum Bak. in *Flor. Brit. Ind.* ii. 172.

Only distinguished from *A. racemosus* by its further-exserted pods and its rather longer pedicels; its leaves are occasionally 3-foliolate as in *A. belgaumensis*, the leaflets being oblong or lanceolate as in that species.

12. *ALYSICARPUS ROTUNDIFOLIUS* Dalz. *Desmodium rotundifolium* Bak. in *Flor. Brit. Ind.* ii. 172.

Fruits exactly as in *A. parviflorus*, from which it is distinguished by its rather larger, slightly exserted corollas and its obovate-oblong to orbicular leaves which are hardly distinguishable from those of *A. racemosus*. The writer's reason for proposing a new subgenus for this natural group is that the calyx-teeth in none of them become imbricated: hence all of them violate the limits of the section *Macrocalycinae* as defined in the *F. B. I.*, which includes two of them therein. His reason moreover for retaining the group in *Alysicarpus* rather than for transferring all four species to *Desmodium*, of which all have the pods, is that it seems better to locate the group in a small manageable genus like *Alysicarpus*, than to transfer them to one, like *Desmodium*, already of unwieldy bulk. As a matter of fact the group stands intermediate between these two genera, and indicates that probably they are not naturally separable.

The characters finally separating the two genera are, according to the Key in the *Flora of British India*, joints "turgid" in *Alysicarpus*, "flattened" in *Desmodium*. Yet the joints of the pods of *Desmodium umbellatum* without being broader are thrice the thickness of those in *Alysicarpus belgaumensis*. In the definitions of the two genera the only tangible distinctions are corolla "included" in *Alysicarpus*, "exserted" in *Desmodium*; after having described the corolla as exserted for the genus as a whole, it becomes necessary for the *F. B. I.* to indicate that one of the distinctive characters of *Desmodium parviflorum* is that the corolla is included. It seems therefore better to adopt an arrangement which excludes from *Desmodium* a species that, by its admission, violates the solitary distinctive generic character.

47b. NEOCOLLETTIA HEMSL.

A slender trailing herb rooting at the nodes. *Leaves* pinnately 3-foliolate; stipules rigid striate persistent. *Flowers* small axillary solitary or 2-3 together on a rather long slender peduncle, 2-bracteolate near the calyx; the peduncle bearing a large stipitate saddle-shaped bract enveloping the calyx. *Calyx* tubular 15-nerved subequally 5-lobed, lobes short rounded. *Standard* suborbicular without appendages; wings free, keel straight quite obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, 1-ovulate; style inflexed. A single species.

1. NEOCOLLETTIA GRACILIS *Hemsl. Journ. Linn. Soc.* xxviii. 44, t. 6. *Stylosanthes* "facie oxalidea" *Wall. Cat.* 5974. *Desmodium Rottleri* *Bak. in Fl. Brit. Ind.* ii. 174 *in part.* *Teramnus Wallichii* *Kurz, Journ. As. Soc. Beng.* xlv. pt. 2. 255.

BURMA; Prome, *Wallich* 5974! Posoboio, in the plains, *Collett* n. 26!

Apparently perennial; stems creeping elongated very slender slightly strigose. *Leaves* trifoliolate, petiole slender 1-2 in. long; leaflets petiolulate, middle petiolule longest; membranous pale-green obcordate, $\frac{3}{4}$ in. long, glabrous above, sparsely strigose beneath, stipules small; stipels minute subulate. *Flowers* under $\frac{1}{4}$ in., peduncles rather shorter than the flowers, strigose as are the bracts and bracteoles beneath, and the calyx externally. *Petals* long-clawed, standard retuse, wings oblong, spurred and also toothed on lower margin; ovary glabrous.

An interesting genus more resembling a *Phaseolid* than a *Hedysarioid*, but with floral structure most closely approaching that of the next genus. The single species bears a considerable superficial resemblance to *Desmodium Rottleri* *Bak.* (*Eleiotes Rottleri* *W. & A.*), for which it may casually be mistaken. Ripe fruit is unknown, and it is to be hoped that members who may meet with the plant in Burma will kindly communicate complete specimens.

47c. PHYLACIUM BENN.

Climbing herbs. *Leaves* 3-foliolate; stipules persistent small linear or lanceolate, leaflets stipellate. *Flowers* in axillary racemes, shortly pedicelled, 2-bracteolate near the calyx, completely enveloped, as ultimately is the legume, in a large boat-shaped membranous much accres-

cent bract. *Calyx* tubular sub-2-labiate, 4-toothed. *Standard* ovate apex retuse, base 2-auriculate; wings oblong, long-spurred, spurs incurved clasped by the auricles of standard; keel straight obtuse shortly spurred. *Stamens* diadelphous, posterior filament adnate to base of standard-claw. *Ovary* short-stalked, its base surrounded by a shallow disc; ovule solitary; style inflexed. *Legume* short-stalked ovate-rotund, acute. Species 2; Indo-Chinese and Malayan.

1. *PHYLACIUM MAJUS* Coll. & Hemsl., *Journ. Linn. Soc.* xxviii. 44. t. 7; young parts rather densely adpressed-hirsute; leaves densely hairy beneath; axillary racemes longer than leaves, sometimes paniculately branched; upper lip of calyx subentire deltoid-rotund, lower 3-lobed, lobes subequal ovate-rotund acute imbricated; pod turgid densely strigose not reticulated, both sutures convex.

BURMA; Shan Hills, near Fort Stedman, *Collett!* Lwekaw and Makhoye, *King's Collectors!*

A slender climber; *leaves* pinnately 3-foliolate long-petioled, leaflets ovate-oblong, base rounded, apex tapering to an obtuse point, margin entire, rather thickly herbaceous, glabrous and green above, grey and densely adpressed-puberulous beneath, 3-4 in. long, $1\frac{1}{2}$ in. wide, stipules and stipels linear, persistent, puberulous; petioles puberulous 2 in. long. *Racemes* 5-6 in. long, occasionally branching, fasciculate; flowers numerous. *Bracts* $1-1\frac{1}{2}$ in. long, glabrous externally, hirsute within, at length scarious. *Calyx* $\frac{1}{6}$ in., externally hirsute. *Corolla* glabrous, $\frac{3}{4}$ in. long. *Pod* $\frac{1}{4}$ in.

2. *PHYLACIUM BRACTEOSUM* Benn. *Pl. Jav. Rar.* 159. t. 33; young parts and leaves beneath sparingly adpressed-hirsute; axillary racemes shorter than leaves, aggregated few-fld.; upper lip of calyx entire ovate, lower 3-lobed, lobes lanceolate the central rather larger, none overlapping; pod compressed, sparsely hirsute, reticulate-veined, convex in front, straight posteriorly. *Benth. Pl. Jungh.* i. 231; *Miq. Flor. Ind. Bat.* i. 228; *Prain, Journ. As. Soc. Beng.* lxvi. 2. 129.

PERAK; near Gunong Pondo, 200-300 feet above sea level, in open jungle, *Kunstler* n. 8367! **DISTRIB.** From Sumatra (*Forbes* n. 1436! n. 2646!) and Java to the Philippines.

A slender climber; *leaves* pinnately 3-foliolate, long-petioled, leaflets ovate-oblong, base rounded, apex obtuse, margin entire, thinly herbaceous, green on both surfaces, glabrous above, sparingly hirsute beneath, 2-3 in. long, $1\frac{1}{2}$ in. wide, stipules and stipels linear, persistent, sparsely hirsute, petioles glabrescent, $1\frac{1}{2}$ in. long. *Racemes* 2-10 together, about $1\frac{1}{2}$ -2 in. long, fasciculate, flowers few. *Bracts* $1-1\frac{1}{2}$ in. long, glabrous externally, sparingly hirsute within, pale-green. *Calyx* $\frac{1}{6}$ in., externally sparsely hirsute. *Corolla* white with pink tinge, glabrous, $\frac{1}{3}$ in. long. *Pod* $\frac{1}{4}$ in.

50. DESMODIUM DESV.

1. DESMODIUM UMBELLATUM DC.

This is a purely littoral species that extends, as so many of the class do, from W. Polynesia to the Mascarene Islands. It is scarcely truly Indian, being only report-

ed from Ceylon and the Sundribuns to the west of the Sea of Bengal. It is, however, extremely plentiful, to the east of that sea, on the shores of Southern Burma, of the Andaman and Nicobar Islands, and of the Malay Peninsula and Archipelago. All inland localities cited in botanical works for this species are erroneous.

VAR. *hirsutum* DC. *Prodr.* ii. 325, not mentioned in the *F. B. I.* account of the species, looks very distinct on account of its more villous branches and petioles and its persistently pubescent pods, but is not perhaps a very valid variety. Strangely it is only known from plants grown in the Calcutta garden and in the garden at Buitenzorg, where (as the Collector's ticket notes) it was an introduction from Calcutta; *Wall. Cat.* n. 5687 D, *Hort. Bogor.* n. 2037 are good examples of the form. This 'variety' has been by Dr. Wallich and others confounded with the very different *Wall. Cat.* n. 5687 B., which at first apparently Dr. Wallich *did* consider separable, and which is a very distinct species. *

1b. *DESMODIUM WALLICHII* Prain; branches slightly angled, leaflets obtuse mucronulate, mesial rhomboid almost as long as broad, joints of pod large as long as broad, persistently hirsute. *D. umbellatum* Wall. *Cat.* 5687 B; *Coll. & Hemsl., Journ. Linn. Soc.* xxviii. 42, not of DC.

UPPER BURMA; Segain, Lime Hills, Wallich! Meiktila, Collett!

A shrub with densely fulvous young branches. *Petioles* $\frac{3}{4}$ –1 in., leaflets subcoriaceous, glabrous above, rather densely fulvous-tomentose beneath, the veins and veinlets very distinctly raised, end-leaflet $2\frac{1}{2}$ in. in diam. *Flowers* subumbellate, the peduncle prolonged beyond the basal whorl. *Calyx* $\frac{1}{4}$ in., silky, teeth longer than tube. *Corolla* $\frac{1}{2}$ in. *Pod* 1–1 $\frac{1}{2}$ in., joints 3–4, strigose.

Dr. Wallich at first gave to this the MSS. name *Desmodium rhomboideum*. The name unfortunately cannot be used as there is a *nomen nudum*, *D. rhomboideum* Sweet, *Hort. Brit.* ed. ii. 151, which cannot refer to this plant. Sweet's name is one of those purely catalogue publications that give so much trouble to botanists. It was employed by its author to indicate *Hedysarum rhombifolium* Roxb. (not of Elliott) a plant that was raised in the Calcutta garden from seed sent to Dr. Roxburgh from Upper India in 1811 by Genl. Hardwicke. Roxburgh allowed it to drop out of his lists for the subsequent *Flora Indica*, (he issued the name in the *Hortus Bengalensis*) and he makes no reference to it in the manuscript copy of his description of Indian plants preserved at Calcutta. Dr. Wallich's annotated copy of the *Hortus Bengalensis* shows that he did not know the plant, and Voigt's reference to it in the *Hortus Suburbanus* where (not knowing that Sweet had already taken the trouble to change its name) he calls it *D. Harwickianum*, is copied from Roxburgh's original reference. All the evidence now available points to its being the plant at present known as *D. podocarpum*.

1c. *DESMODIUM RUGOSUM* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 137; branches terete, leaflets acute, mesial nearly twice as long as broad, joints of pod large, 1 $\frac{1}{2}$ times as long as broad, persistently hirsute.

TENASSERIM; Lathorga, 2000 feet, common, Gallatly! KEDAH; Langkawi, Curtis n. 2550!

A gregarious straggling shrub with glabrescent lenticelled branches. *Petioles* 1–1 $\frac{1}{2}$ in., leaflets coriaceous, glabrous above, hirsute only on the very prominent veins and veinlets beneath, end-leaflet 6–7 in. long by 3 in. across, ovate-acute tapering in both directions from the middle, the base narrowly truncate. *Flowers* umbellate,

peduncles short. *Calyx* $\frac{1}{8}$ in., teeth twice as long as tube. *Pods* $\frac{1}{2}$ -1 in., 2-4-jointed; strigose.

A very distinct species, resembling *D. umbellatum* in its inflorescence and *D. Wallichii* in the reticulated under-surface of its leaves, but differing extremely from both in the shape of its leaflets. Like *D. Wallichii* this is an inland species.

2. DESMODIUM CEPHALOTES Wall.

VAR. typica; pod silky. *D. Cephalotes* Wall. *Cat.* 5721; *W. & A. Prodr.* 224. *Hedysarum Cephalotes* Roxb. *Flor. Ind.* iii. 360.

Sub-Himalayan tract from Dehra Dun (*King! Duthie!*) eastward. Very common throughout Indo-China, extremely rare in India proper.

VAR. congestum; pod glabrescent, leaves and branches glabrous or only slightly silky. *D. congestum* Wall. *Cat.* 5723; *W. & A. Prodr.* 224. *Hedysarum umbellatum* Roxb. *Flor. Ind.* iii. 360 (*not of Linn.*)

Very common from Canara and the Concan southwards, also in Ceylon. *MISHMI*; *Griffith!* UPPER BURMA; *Anderson!* PEGU; *Wallich!* *Kurz!* TENASSERIM; *Parish!* CHITTAGONG; *Hooker!* *Clarke!*

The two varieties are very distinct; there is however little doubt that Mr. Baker is right in refusing to follow Drs. Roxburgh, Wallich and Wight in treating them as specifically separable. The typical *D. Cephalotes* is as rare in India as the variety "*congestum*" is in Indo-China.

2b. *DESMODIUM OLIVACEUM* Prain; branches triquetrous, leaflets acuminate twice as long as broad, joints of pods small, broader than long.

UPPER BURMA; Chindwin Hills, *Prazer!* Maymyo, *King's Collector!* Shan Hills, *King's Collectors!*

A shrub or small tree, with sharply triangular branches, densely clothed, especially along the angles, with long patent greenish-yellow hairs; petioles 1-1 $\frac{1}{2}$ in., deeply channelled, densely villous, leaflets glabrous except midrib above, densely uniformly velvety beneath, end-leaflet 8 in. long, 3 $\frac{1}{2}$ in. across. *Flowers* in dense globose heads, on short, angled, villous pedicels; calyx $\frac{1}{8}$ in., teeth $\frac{1}{2}$ as long as tube; corolla white, $\frac{1}{2}$ in. *Pod* $\frac{1}{2}$ in. long, sparsely strigose, joints 2 only, each broader than long.

Near to *D. Cephalotes* but larger in all its parts and with different tomentum and a very different pod.

4. DESMODIUM GRANDE Kurz.

Apparently a rare species; the specimens originally described by Kurz were not collected by him but by Dr. J. Anderson, F.R.S., at Tagoung. The specimens previously collected by Dr. Griffith, which the *F. B. I.* suggests may have come from Tenasserim, came from Upper Burma; they were collected during the journey made by Griffith from Upper Assam through the Hukung Valley to Ava. The only recent collection of this species is from Mingyin, where it was obtained by Prazer.

7. DESMODIUM LABURNIFOLIUM DC.

Add to localities of *F. B. I.*:—UPPER BURMA; Maymyo, *King's Collector!*

8. *DESMODIUM TRIQUETRUM* DC.

To this species the F. B. I. has reduced *D. auriculatum* DC., *D. pseudo-triquetrum* DC., and *D. alatum* DC. The three plants so named by M. De Candolle are, however, extremely distinct from *D. triquetrum* and from each other, and as no intermediates occur even in places where two or more of the forms have been found growing side by side, it is highly probable that they should all be recognised as specifically distinct. It may, however, suffice if, for the present, they are dealt with as only subspecies of one somewhat variable "species."

SUBSP. *geniuna*; erect; pods hairy throughout. *Desmodium triquetrum* DC. Prodr. ii. 326. *Hedysarum triquetrum* Linn. Sp. Pl. 746; *Burm. Flor. Ind. t. 52. f. 2.* *H. alatum* Roxb. Hort. Beng. 56; *Flor. Ind. iii. 348.*

CENTRAL, WESTERN and SOUTHERN INDIA and CEYLON. ASSAM, KHASIA, CHITTAGONG, BURMA, TENASSERIM, PERAK. DISTRIB. Java, Tonkin, China (Hong-Kong only, and perhaps introduced).

This is common in both the Eastern and Western Peninsulas; it is somewhat remarkable that it has never been found in the sub-Himalayan tract where *D. pseudo-triquetrum* is so common.

At Shaila in the Khasia Hills Mr. C. B. Clarke has found this (Clarke n. 14883) and *D. alatum* (Clarke n. 14469) growing side by side; in the Island of Pah-tau, Tenasserim, Mr. Proudlock has similarly found this and *D. auriculatum* growing together; in neither case were any intermediates collected.

SUBSP. *auriculatum*; erect; pods firmly cartilaginous, glabrous throughout. *Desmodium auriculatum* DC. Prodr. ii. 326.

SILHET, Clarke! Coasts of TENASSERIM and ANDAMANS, plentiful. DISTRIB. Malay Archipelago, Mascarene Islands.

This appears to be almost purely a seashore species though it has been found on two occasions in Silhet, both times by Mr. Clarke. On the specimens from Mauritius in Herb. Calcutta, Bouton has suggested that it is an introduction from India. More probably, however, it is a member of the littoral flora of the Malay region which extends as far as, and includes the coast species of, the Mascarene group. The plant was originally described from Timor specimens.

SUBSP. *alatum*; erect; pods thinly membranous, very broad, glabrous throughout. *Desmodium alatum* DC. Prodr. ii. 326 (not *Hedysarum alatum* Roxb.)

ASSAM; KHASIA; CACHAR; CHITTAGONG.

This is the most palpably distinct of all the four forms included under *D. triquetrum*. It is apparently confined to the area indicated, and has never been found in India proper. De Candolle's description is unmistakable; he has, however, very unfortunately cited both the locality and the synonym given by Roxburgh for the genuine *D. triquetrum*. Roxburgh expressly states that the pod of his *Hedysarum alatum* is "hairy;" this alone is sufficient to show that the "*alatum*" of Roxburgh and the "*alatum*" of De Candolle cannot possibly be the same plant.

SUBSP. *pseudo-triquetrum*; diffuse; pods thin glabrous except along the sutures each of which has a line of adpressed hairs. *Desmodium pseudo-triquetrum* DC. Prodr. ii. 326. *Hedysarum triquetrum* Roxb. Hort. Beng. 56 and *Flor. Ind. iii. 347* not of Linn.

Along the foot of the HIMALAYA from Dehra Dun, the Nepal and Sikkim Terai to the Duars; plains of BENGAL, and valley of ASSAM, common. Khasia Hills, Clarke! Naga Hills, Prain! Watt!

Roxburgh has left no figure of his *Hedysarum alatum*, but his description fits *D. triquetrum* and *D. triquetrum* only. The account of his own *Hedysarum triquetrum* is incomplete because it does not fully describe the pods. Its prostrate habit, however, should almost have sufficed to indicate that this is the plant intended, and Roxburgh has fortunately left a drawing which proves that his *Hedysarum triquetrum* is not that of Linnaeus but is the *Desmodium pseudo-triquetrum* of De Caudolle. Wight and Arnott (*Prodromus* 225) clearly never saw *D. alatum* DC., the plant which they supposed to be that species is *D. auriculatum*.

9. DESMODIUM ORMOCARPOIDES DC.

VAR. *typica*; leaves inconspicuously downy beneath. DC. *Prodr.* ii. 327. *Bak.* in *Flor. Brit. Ind.* ii. 164. Add to synonyms of *F. B. I.*:—*D. teres* Clarke, *Journ. Linn. Soc.* xxv. 16 not of Wall.

Add to localities:—ASSAM; Gauhati, *G. Mann*! Nichuguard, *Clarke*!

Mr. Clarke has identified his plant with *D. teres* Wall. which mainly differs from *D. ormocarpoides* in having a very short petiole and is perhaps not specifically distinct; even in that case, however, *D. ormocarpoides* is the older name.

VAR. *velutina* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 142; leaves densely velvety beneath.

S. ANDAMAM; Goplakabang, Hobdaypur, etc., *King*! *King's Collectors*! PAHANG; Kwala Tembeling, *Ridley* n. 2605! SELANGOR; *Ridley* 7295!

10. DESMODIUM TERES Wall.

This is evidently very rare or at least very local in Upper Burma. Mr. Prazer has sent to Calcutta a solitary specimen from Mingyin, the only one received since Dr. Wallich first found the plant.

13. DESMODIUM PODOCARPUM DC.; *Bak.* in *Flor. Brit. Ind.* ii. 165, *excl. syn.* *D. japonicum*. Leaflets broadly ovate, terminal rhomboid, lateral subrhomboid, sparsely puberulous above and below.

Add to synonyms of *F. B. I.*:—*Desmodium rhomboideum* Sweet, *Hort. Brit.* ed. ii. 151. *D. Harwickianum* Voigt, *Hort. Calcutt.* 223. *Hedysarum rhombifolium* Roxb. *Hort. Beng.* 57 not of Elliott.

Amend localities:—NORTH-WEST HIMALAYA; very common from Kashmir, *Clarke*, to Kamaon, *Blinkworth*, etc.

The locality given by Roxburgh for Genl. Hardwicke's plant is "Cawnpore;" this probably only means that it was from Cawnpore that Hardwicke despatched the seeds to Roxburgh. It is usual to suppose that the plants which were introduced to the Calcutta garden through the kindness of Genl. Hardwicke, came from the plains of Upper India; the writer has already had occasion to point out that, in the majority of instances, Genl. Hardwicke's contributions that proved unfamiliar to Dr. Roxburgh have been found eventually to have come from Dehra Dun, the Garhwal Babur and the lower slopes of the North-West Himalaya.

Dr. Wallich sent this plant to Geneva among the specimens from Nepal that were described by M. De Caudolle in the volumes of the *Prodromus* published before 1828, the year in which the dispersal of the Hon'ble East India Company's

Herbarium was begun. Hence it happens that M. De Candolle gives Nepal as its locality in the *Prodromus*. As a matter of fact, however, Dr. Wallich did not collect this species in Nepal at all; his specimens came from Kamaon where they were collected by Mr. Blinkworth. The species is represented in the Wallichian herbarium by n. 5711 A. And a specimen of the North-West Himalayan species of which Wall. Cat. 5711 A. is an example has been kindly compared by M. Casimir De Candolle and Mr. Buser with the type of *D. podocarpum* in the *Prodromus* Herbarium; the result has been to show that the two are the same plant. Dr. Scully and Mr. Maries, the only other collectors who have sent plants from Nepal since Dr. Wallich's visit to that country, have equally failed to find *D. podocarpum* there.

Dr. Wallich's Cat. n. 5711 B. did come from Nepal. Unfortunately, however, under this letter was issued a mixture of two plants, neither of which is *D. podocarpum*. One of them is *D. laxum* DC. which was at a later date redescribed by Mr. Benthams as *D. Gardneri*. In the *Flora of British India* a compromise is adopted as regards *D. laxum*; the Himalayan examples of the plant are treated as belonging to *D. podocarpum*, though Mr. Baker deviates from Dr. Wallich's treatment to the extent of making them varietally distinct; the South Indian examples are, however, kept apart under Benthams name *D. Gardneri*. In the *Flora of British India* Kamaon is given as a locality for *D. laxum* though no one has hitherto sent it from that region; Assam as a locality is omitted, though one of the specimens quoted (Wall. Cat. n. 5720) came from that province. And it will be observed that although, as a Nepal plant, Wallich merged it in *D. podocarpum*, as an Assam one he issued it as a distinct species, *D. trinerve*.

The other plant mixed with *D. podocarpum* by Wallich under n. 5711 B. is *D. oxyphyllum* DC., regarding the identity of which a wide-spread misunderstanding has arisen; the thanks of Indian botanists are due to M. Casimir De Candolle who, with Mr. Buser, has compared specimens of the plant with the type sheets in the *Prodromus* Herbarium, and has been so kind as to present to Herb. Calcutta, from his own herbarium, one of the actual Nepalese specimens that were originally sent to Geneva by Dr. Wallich and that formed the basis of *D. oxyphyllum*. He has thus finally removed any doubt that might exist as to the identity of the species.

14. *DESMODIUM LAXUM* DC. *Prodr.* ii. 336.

Add to synonyms of *F. B. I.*:—*D. trinerve* Grah. in Wall. Cat. 5720. *D. Gardneri* Benth. *Pl. Jungh.* 226. *D. podocarpum* var. *laxum* Bak. in *Flor. Brit. Ind.* ii. 165 not *D. podocarpum* DC.

Add to localities of *F. B. I.*:—NEPAL; Wallich! SIKKIM; from the Terai (Clarke 36801! Kurz!) up to 2000 feet elev., (King! Clarke 13195!) Eastern Duars, Heawood! ASSAM Valley at Goalpara, Hamilton! Gauhati, Simons! Sibsagar, Masters! MALAY PENINSULA; Perak, Wray n. 1608!

This species does not vary in any of its localities and is always very easily distinguished by its acuminate leaflets, boldly 3-nerved at the base, and by the very long stalks to its pods.

M. Casimir De Candolle and M. Buser have also kindly examined specimens of veritable *D. Gardneri* and find that *D. Gardneri* is true *D. laxum* DC.

14b. *DESMODIUM OXYPHYLLUM* DC. *Prodr.* ii. 336; corolla small, bracts linear, minute, stalk of pod twice as long as calyx, pedicels short,

leaflets ovate-lanceolate all gradually narrowing to an acute point. *D. japonicum* Miq. *Ann. Mus. Lugd.-Bat.* iii. 46. *D. podocarpum* Wall. *Cat.* 5711 B (in part); Bak. in *Flor. Brit. Ind.* ii. 165 in part, not of DC.

HIMALAYA; Sirmur; Vicary! Nepal; Wallich! Sikkim; Hooker! Gammie! ASSAM; Khasia, Hooker! Clarke! Mann! Naga Hills, Prain!
DISTRIB. China, Japan.

Stems 2-3 feet, herbaceous, terete, branches angular glabrous. *Stipules* small. *Corolla* and *pod* as in *D. podocarpum*.

It may be admitted that this is the eastern representative of *D. podocarpum* but that it should be reduced, even as a distinct variety, to *D. podocarpum* the writer cannot believe. The foliage is totally different and there are no intermediates.

The confusion that has grown up round this and the two preceding species illustrates well the danger of placing too great a reliance on the numbered sheets of the Wallichian Herbarium. That these show a larger number of erroneous identifications than other issued collections is not implied; on the contrary, the Herbarium was carefully distributed by one of the most accurate botanists then living, with the assistance in particular families of some of the most eminent European systematists of their time. In spite of this errors were bound to creep in and the trouble caused by these errors in the families that had already been dealt with by Mr. De Candolle in those volumes of the *Prodromus* published before Dr. Wallich's *Herbarium* was issued, is so great that the writer would warn all botanists, who wish their results to be accurate, to place no confidence in the Wallichian name for a species of any of these families until he has confirmed it by comparison with the specimen so named in the *Prodromus* Herbarium. For Dr. Wallich put no number on any of the sheets that he sent originally to Mr. De Candolle and many of the identifications with species which Mr. De Candolle had described were manifestly made subsequently by Dr. Wallich without referring either to Mr. De Candolle's descriptions or specimens. The same remarks apply to the specimens sent by Wallich to Lambert and used by D. Don in the preparation of his *Prodr. Flor. Nepal*. Here, also, the difficulty is greater, since the keepers of the national Collections unfortunately failed to secure the Wallichian bundles in the *Herb. Lambert.*, when Mr. Lambert's collection was dispersed.

In an angry pamphlet Dr. Griffith complained, when he came to act as Dr. Wallich's substitute, that the Calcutta Herbarium had been depleted by the distribution of the H. E. I. C. Herbarium. This was true; still on the whole Indian botanists may be said not to have grudged the rather wholesale dispersal, seeing that what was their loss was the gain of the great European Herbaria. It was besides always possible to begin afresh, and there has been brought together at Calcutta, since his time, a collection such as probably Dr. Wallich never dreamed of. But what has been in the highest degree detrimental to Indian systematic botany has been the peculiar way in which Wallichian specimens, no matter how fragmentary, have been converted into fetishes; and in which Wallichian names, in cases like the present, have been made to override names that, accompanied by intelligible descriptions, are to be found attached to the same plants in the *Prodromus* Herbarium. Indian botanists have never grudged the loss of the typical Wallichian specimens, but they have often felt, considering how these types have been misused, that it would have been a greater blessing to Indian botany, had the Wallichian Herbarium, by some happy accident, totally disappeared.

16. *Desmodium scalpe* DC.

Add to localities of *F. B. I.*:—MANIPUR; *Clarke* n. 42029!

17. *Desmodium obcordatum* Kurz.

Add to distribution:—Sumatra (*Teysmann* n. 3909!)

18. *Desmodium oblongum* Wall.

VAR. *typica*; leaves oblong, obtuse.

Add to localities of *F. B. I.*:—MANIPUR, *Watt* n. 5083!

VAR. *acutifolium*; leaves larger, ovate-lanceolate acute, flowers rather smaller, whole plant larger and stouter. *D. substipulaceum* Kurz, *Journ. As. Soc. Beng.* pt. 2. xlv. 230 not of Bl.

BURMA; Nattoung Mts., *Revd. Cross*! Mogouk, *Cooper*!

It is just possible that this variety may be specifically distinct from *D. obtusum*; this at least was the opinion of Mr. Kurz. Its fruits, however, are exactly like those of *D. oblongum* and are not like those of the plant to which he has referred it. The plant with which Mr. Kurz has united it has, besides, 3-foliolate leaves, while all our specimens of this have simple leaves. The latter difference, however, may not be of specific importance, since *D. oblongum* proper is described by Mr. Baker as having simple leaves, which is true of all our specimens at Calcutta except Wall. Cat. n. 5714 itself, where the leaves are 3-foliolate.

19. *Desmodium oblatum* Bak.

This, as the *F. B. I.* points out, is very close to n. 44. *D. reniforme*, which is also cited as occurring in Burma. Mr. Kurz has doubted (*Journ. As. Soc. Beng.* xlv. pt. 2. 230) that *D. reniforme* is Burmese; certainly all Kurz's specimens from Burma, as well as the only Wallichian one at Calcutta (*Wall. Cat.* n. 5702—the Prome portion only) are *D. oblatum* rather than *D. reniforme*; recently, however, genuine *D. reniforme* has been received from Maymyo and elsewhere. But the plants do not appear to the writer to differ even as varieties; *D. oblatum* does not always have longer pedicels than *D. reniforme*, and some of our Maymyo specimens are interesting on account of their having the slightly indented pods of *D. reniforme* and the deeply indented ones of *D. oblatum* on the same branch.

20. *Desmodium sinuatum* Blume.

Add to localities of *F. B. I.*:—UPPER BURMA; Mogouk, *Cooper*!

Add to distribution:—Szechuen, *Pratt* (n. 422!)

This appears to be no more than the representative in the Eastern Peninsula of the Himalayan *D. sequax* (n. 31). Except for the rather closer tomentum on the leaves beneath, and for the fact that the end-leaflet is rhomboid and obtuse in this plant, instead of ovate-oblong and acute as in *D. sequax*, it would be impossible to distinguish the two. From their position in the *F. B. I.* it might be gathered that the two plants differ as regards calyx. This, however, is not the case, the calyx in the two is indistinguishable, as are the corollas and the pods.

Pratt n. 422 has been issued as *D. grossicrenatum* Franch. If this identification be correct then Mr. Franchet's name becomes a synonym of *D. sinuatum*. There is not, however, any authentic example of *D. grossicrenatum* at Calcutta.

21. *Desmodium sambuense* DC.

Add to localities of *F. B. I.*:—BURMA; common from the Chin Hills to the Shan Plateau.

This species is the *Desmodium floribundum* of G. Don (*Hedysarum floribundum* of D. Don). The *F. B. I.* suggests that it is the same as *D. sambuense* DC. (*Hedysarum sambuense* D. Don); this is undoubtedly the case. The name *D. floribundum*, used in the *F. B. I.*, only dates from 1832, whereas the names *D. multiflorum* DC. and *D. elegans* Lindl., given as synonyms, date from 1825 and 1826 respectively. Authors have accorded preference now to one, now to another of the rival names *D. floribundum* and *D. multiflorum*, while as a matter of fact the synonym that should have been used throughout is the one here employed.

D. elegans has thinner leaves, less hairy beneath, and blunter at the points than those of *D. sambuense* proper; *D. floribundum* (*D. multiflorum*) has more numerous racemes and smaller leaves than *D. sambuense* proper. But all sorts of intermediates occur, and it is impossible to separate the three even as varieties.

21b. *DESMODIUM KULHAITENSE* C. B. Clarke MSS.; leaflets entire, pedicels long, joints many small quite glabrous.

SIKKIM; at Hee, 4000 feet, Clarke nn. 13096! 13109!

Branches woody, obscurely angled, sparsely hirsute. *Stipules* lanceolate, $\frac{1}{2}$ in., leaflets subcoriaceous, wide-lanceolate, perfectly glabrous above, very densely velvety with adpressed grey-silky hairs beneath; end-leaflet $2\frac{1}{2}$ –4 in. long, $\frac{3}{4}$ –1 in. across, on a petiole $\frac{1}{2}$ – $\frac{3}{4}$ in. long, gradually tapering upwards from junction of lower and middle thirds to a long subacuminate point, and downwards to a rounded or cuneate-truncate base; lateral leaflets almost sessile, 2–3 in. long, $\frac{1}{2}$ to $\frac{3}{4}$ in. across, tapering upwards like the central but with a very oblique rounded base. *Racemes* rather copious, axillary and terminal, 5–8 in. long; pedicels usually $\frac{1}{2}$ in., very slender, glabrescent. *Calyx* $\frac{1}{2}$ in., teeth larger than tube. *Corolla* unknown. *Pods* 1–1 $\frac{1}{2}$ in. long, under $\frac{1}{8}$ in. broad; joints 6–8, longer than broad, without pubescence, finely reticulate-veined.

This plant is very nearly related to the preceding, of which it has the habit. But its less angular branches, its very different leaves, and its glabrous pods with finely reticulate joints borne on slender pedicels twice as long, make it very distinct. Mr. Clarke, the only botanist who has met with the plant, originally gave to his specimens the name now quoted, perhaps without any intention of incurring the responsibility of recognising it as specifically distinct; indeed he has, at a later date, himself reduced it to *D. multiflorum* (*D. sambuense*). Mr. Kurz, Mr. Brace, Dr. King and the writer having at different times independently examined Mr. Clarke's specimens, and having all formed the opinion that his plant must be distinguished as a species, this opportunity is taken of providing the diagnosis necessary for its recognition; Mr. Clarke's original tentative name, being an excellent one, has been adopted here.

The relationship of this plant is, however, even more close with the next species, of which it has the long-pedicelled flowers and glabrous pods, with joints reticulated externally, than it is with *D. sambuense*. But the species referred to (*D. khasianum*) has much larger pods, as large as in *D. serriferum* and in *D. tiliaefolium*, while the somewhat similar leaflets, also glabrous above, are smaller and much less hairy beneath.

21c. *DESMODIUM KHASIANUM* Prain; leaflets entire, pedicels long, corolla large, bracts lanceolate, joints of pod many large quite glabrous, reticulate-veined. *D. serriferum* Wall. Cat. 5708 (C only, in

Cat. Lith. p. 215 *inter addend.*) *D. oxyphyllum* *Herb. Ind. Or. H. f. & T.*, not of DC. and hardly of Bak.

KHASIA and JAINTEA Hills; "Montes Sillet," i.e., Khasia, Gomez (*Wall. Cat.* 5708 C)! Khasia, 2-4000 feet, *Hooker and Thomson!* Griffith (*Kew Dist.* n. 1621, Field n. 389)! *Gallatly* n. 676! *Mann* n. 281! *Clarke* nn. 15154! 17813! 19167! 40415! 45119! Jowai, *Dr. King's Collector!*

Branches slender terete, soon glabrescent. *Petiole* $\frac{3}{4}$ in. to 1 in. long; leaflets subcoriaceous ovate, terminal 2-2 $\frac{1}{2}$ in. long, 1 in. across, tapering from the middle to an abruptly short-acuminate apex and to a cuneate-truncate base, on a petiolule $\frac{1}{4}$ in. long; lateral similar but smaller, shortly petioluled, 1-1 $\frac{1}{2}$ in. long and with a subequally rounded base; all quite glabrous above, clothed with adpressed silky hairs, and finely reticulate-veined beneath. *Racemes* copious, axillary and terminal, moderately close; bracts lanceolate, ciliated, $\frac{1}{4}$ in. long; pedicels erecto-patent, slender, glabrescent, $\frac{1}{2}$ - $\frac{3}{4}$ in. long. *Calyx* $\frac{1}{8}$ in., teeth triangular as long as tube. *Corolla* $\frac{3}{8}$ in. *Pod* 1 $\frac{1}{2}$ -2 in., joints $\frac{3}{16}$ in. wide, rather longer than broad, 4-7, quite glabrous, finely reticulated.

This species is apparently confined to the mountain slopes to the north of Silhet. It was issued under n. 5708 C. by Dr. Wallich—though at a date subsequent to the original issue of n. 5708—as part of his *Desmodium serriferum*, a species from Nepal and Kamaon of which the types are *Wall. Cat.* n. 5708 A. & n. 5708 B. (*Lith. Cat.* p. 195).

Though somewhat nearly related to *D. serriferum*, this is very easily distinguished by its longer pedicels, its perfectly entire and somewhat differently shaped leaflets, as well as by its quite glabrous pods, the reticulations of which stand in bolder relief, and by its very different calyx with acute teeth as long as the tube.

Wall. Cat. n. 5708 C. is not referred to in the *F. B. I.*, but that this plant (which occurs as *D. oxyphyllum* both in *Herb. Griffith.* and in *Herb. Ind. Or.*) has been included under *D. oxyphyllum* in *Flor. Brit. Ind.* ii. 167 seems probable from the fact that Khasia is there cited as a locality for that species; *D. serriferum* (*D. oxyphyllum* Bak., not DC.) does not occur anywhere to the east of Nepal, whence came the specimen originally described by Mr. De Candolle.

22. DESMODIUM CONFERTUM DC.

The original specimens of *Hedysarum dioicum* Ham. (*Desmodium dioicum* DC.), named by Hamilton himself, show that *D. confertum* is only *D. dioicum* DC. But from the fact that the name employed in the *F. B. I.* is much more familiar, and also because the plant is not truly dioecious, it seems unnecessary to give up its use in favour of the synonym that perhaps technically ought to replace it.

23. DESMODIUM SERRIFERUM *Wall. Cat.* 5708 A and B. *D. oxyphyllum* Bak. in *Flor. Brit. Ind.* ii. 167 not of DC, nor of *Herb. Ind. Or.*

This species is nearly related to the preceding but is at once distinguished by its very short obtuse calyx-teeth.

A slight alteration must be made in the account of the distribution of the species as given in the *F. B. I.* The plant has never been found in Assam or in Khasia; these localities must therefore be deleted; they depend, as already explained, on the erroneous identification by Dr. Wallich of *D. khasianum* with his own *D. serri-*

ferum. Nor are there any specimens from the Eastern Himalaya at Calcutta; all the Sikkim examples of a plant with flowers and fruits like those of *D. serriferum* have the obtuse or subacute leaves characteristic of *D. tiliaefolium*.

As has been already explained under that species, the true *D. ozyphyllum* is a member of § *Podocarpum* and does not bear the faintest resemblance to *D. serriferum*.

The var. *serriferum* of the *F. B. I.* has no existence. It is made up of two plants:—*Wall. Cat.* 5708 A.—which is, as it happens, exactly the same as *Wall. Cat.* 5708 B.; in any case, even had the two differed, the specimen under the letter A. must obviously have marked the type of Wallich's species: and *Wall. Cat.* 5710 issued by Dr. Wallich as *D. polycarpum*—which it in no way resembles. Indeed, n. 5710 is not distinguishable from *D. tiliaefolium*, as represented by his n. 5707.

24. *DESMODIUM TILIAEFOLIUM* *G. Don.*

This species bears to *D. serriferum* very nearly the relationship that *D. sinuatum* bears to *D. sequax*; that is to say its floral structure is identical and it is only to be distinguished by the shape of its leaflets and the different degree of tomentum on its leaves. To this species Mr. Baker reduces *D. nutans* Wall. which has thicker leaves and very large lax panicles, and *D. argenteum* which has rugose almost coriaceous leaves very densely villous beneath. As represented by Dr. Wallich's three sheets, viz., 5707 (*D. tiliaefolium*); 5713, (*D. argenteum*) and 5706, (*D. nutans*), it would be perfectly easy to define three "species." But intermediates of all kinds abound and the writer has found it impossible to give satisfactory characters for separating them as varieties. The fruits of all three are identical and, indeed, hardly differ from those of *D. serriferum*, in which a monographer must, the writer believes, necessarily ultimately merge all three.

True *D. tiliaefolium* extends from the Kuram Valley, Aitchison! and Hazara, Stewart! to Sikkim, King! and Szechuen, Pratt! But it is very rare in Sikkim, and has never been reported from Nepal or from any portion of the Assam ranges. The other two forms are more local; *D. argenteum* extends only from Nepal westward to Chamba, while *D. nutans* seems to be confined to Kamaon and Garhwal and to be rare there.

The *F. B. I.* reports one or other of the forms, without indicating which, from Tavoy, but no one has hitherto sent specimens of the plant to Calcutta from any part of Burma. In Upper Burma its place appears to be taken by the not dissimilar *D. karenium*, which is at once recognised by its subulate calyx-teeth as long as the tube. In Tenasserim it is replaced by another very distinct species, *D. insigne*, which, with a calyx like that of *D. karenium*, is distinguished both from that species and from *D. tiliaefolium* by its persistent scarious bracts.

24b. *DESMODIUM KARENIUM* *Kurz in Journ. As. Soc. Beng.* xlv. pt. 2. 228 and 232; leaflets usually large acuminate softly velvety-pubescent beneath, pedicels moderately long, bracts lanceolate deciduous, corolla large, joints many, densely clothed with minute brown-pubescence and with white spreading hairs intermixed.

BURMA; Pegu, Bookee Ridges, 4500 feet, *Kurz* n. 1676/C. ! Thoungyeen, Brandis! Shan Hills; at Madoe, Lwekaw, and near Fort Stedman, King's Collectors!

A shrub 4-5 feet high, branches black, angular, glabrescent. Petiole 4 in.; leaflets herbaceous 6 in. long, 3½ in wide, green sparsely setulose-hirsute above,

densely velvety beneath with grey-silky pubescence, all ovate-oblong acuminate, the central wide-cuneate at base, on a petiolule $1\frac{1}{2}$ in. long, the lateral with very short petiolules, almost rounded at base, margins slightly repand-sinuate. *Racemes* copious lax axillary and terminal, very slender and usually shorter than the leaves, often compound, branched at base; pedicels $\frac{1}{4}$ in., very slender, finely puberulous, ascending. *Calyx* $\frac{1}{2}$ in., sparsely pubescent, teeth subulate as long as the widely campanulate tube. *Corolla* $\frac{3}{8}$ in. *Pods* $1-1\frac{1}{2}$ in., joints 5-6, rather longer than broad.

This in general appearance resembles *D. tiliaefolium*, but the black angular stems and the very different calyx and pods amply distinguish it. Though it bears less general resemblance to *D. sambuense* it is in reality most closely related to that species; it has similar stems, not however as in *D. sambuense* with lines of spreading hairs along the angles, and similar though much larger pods, the joints being four times the size of those of *D. sambuense*. The leaves also are very different in shape besides being many times larger; the calyx teeth, too, are much narrower in this species.

24c. *DESMODIUM INSIGNE* Prain; leaflets very large, ovate-acute, densely hoary beneath, pedicels moderately long; bracts lanceolate scarious persistent, corolla large; joints quite glabrous reticulate-venose.

TENASSERIM; at Endine Ghor, 1000 feet, *Gallatly*!

Branches woody, angular, densely uniformly rusty-pubescent. *Petioles* short, $1-1\frac{1}{2}$ in. only; leaflets thick flexible subcoriaceous, green rugose and sparsely setulose above, densely persistently matted with whitish silky hairs beneath; all ovate-acute with rounded bases; the end one, on a petiolule that may be 2 in. long and always exceeds the petiole proper, 9 in. long, 6 in. across; the lateral almost sessile, 6 in. long, 4 in. across. *Racemes* copious lax, sometimes a foot long, axillary and terminal, the latter at times paniculate, pedicels $\frac{1}{4}$ in. finely downy, arising in fascicles from the axils of 2-3 lanceolate externally rusty-pubescent rigid persistent bracts. *Calyx* $\frac{1}{2}$ in., pubescent, teeth triangular, acuminate, rather shorter than the narrow-campanulate tube. *Corolla* $\frac{3}{8}$ in. *Pods* 1 in.; joints about 6, rather broader than long, quite glabrous.

A species very distinct on account of its peculiar persistent rigid bracts, disposed in groups along the rachis of the racemes and with fascicles of pedicels in their axils. The leaves, though of larger size, have the facies of those of that form of *D. tiliaefolium* which constitutes *D. argenteum*.

24d. *DESMODIUM KINGIANUM* Prain; leaflets obtuse or subacute, softly grey-silky beneath, bracts small, pedicels short, joints broad densely shortly tomentose, the sutures densely pubescent with longish white hooked hairs.

BURMA; Shan States at Saga, *King's Collectors*!

Shrubby, branches and petioles rusty-pubescent. *Petiole* 2 in., leaflets rather thick, green, sparsely pubescent above, densely silky beneath, all broad obovate obscurely repand, bases wide-deltoid; central petiolule $\frac{3}{4}$ in. *Racemes* short dense 4 in. long, axillary and terminal pedicels $\frac{1}{6}$ in., erect, puberulous. *Calyx* $\frac{1}{2}$ in. wide, campanulate, pubescent, teeth subulate, remote, as long as tube. *Pod* $1\frac{1}{2}$ in. long, $\frac{1}{4}$ in. wide, dorsal suture straight, ventral very slightly sinuate; joints usually 6, broader than long, the last apiculate, thin, tardily separating.

An exceedingly distinct species with pods altogether different from those of

any other Indian species. The corollas, said by the native collector to be blue, are absent from the specimens reported. The pods most resemble those of *D. gyrans*, but are altogether different in not opening along the ventral suture and in dehiscing transversely. The leaves recall those of *D. sinuatum*.

24c. *DESMODIUM MEGAPHYLLUM* Zoll. Nat. en Geneesk. Arch. iii. 58; leaflets all ovate-lanceolate acuminate repand, densely softly velvety or sparsely silky beneath, pedicels long slender, bracts lanceolate deciduous, corolla medium, joints many, reticulate-veined, sparsely puberulous or glabrous. *Prain, Journ. As. Soc. Beng.* lxi. 2. 139.

VAR. *typica*; leaves softly velvety beneath; secondary nervation hidden by the tomentum; pods sparingly puberulous. *Miq. Flor. Ind. Bat.* i. 245, excluding both synonyms.

PERAK; Valley of Batung. Padang, 2000 feet, *Wray* n. 1441! **DISTRIB.** Java, Tjiboddas (*Kurz* n. 939! issued under the name *D. sequax*; *Zollinger*; *Junghuhn*).

VAR. *glabrescens*; leaves sparsely covered with silky hairs beneath, secondary nervation prominent; pods quite glabrous.

TENASSERIM; Meetan, 4000 feet, and Moolyet 5000 feet, *Gallatly!* Moolyet, *Beddome* n. 21.

A shrub 8 feet high, with dark glabrescent subterete branches. *Petioles* 2 in; leaflets rather pale-green membranous, very sparingly puberulous above, beneath from densely velvety to sparingly puberulous, secondary nervation always prominent but in the Perak and Java form hidden by the denser pubescence; end-leaflet 5 in. long, $2\frac{1}{2}$ –3 in. across, its petiolule $\frac{3}{4}$ in., its base wide-cuneate, lateral-leaflets $3\frac{1}{2}$ in. long, 2 in. across, their bases obliquely rounded, their petiolules short. *Racemes* in rather lax terminal panicles 8–12 in. long; pedicels $\frac{1}{4}$ – $\frac{1}{2}$ in., glabrous, erecto-patent. *Calyx* very small $\frac{1}{4}$ in. long, campanulate, glabrous, teeth triangular shorter than the tube. *Corolla* pale-violet $\frac{3}{8}$ in. *Pod* dull-crimson, 2– $2\frac{1}{2}$ in. long, $\frac{1}{2}$ in. wide, slightly indented on both sutures; joints 6–8, rather longer than broad, distinctly reticulate-venose, sparingly puberulous or glabrous.

A very distinct and beautiful species; the identity of the Perak plant with *Zollinger's* original specimens has been established by Mr. C. B. Clarke who kindly compared the *Desmodia* of Dr. King's Malayan collections with the material of the genus at Kew. *Miquel's* synonym "*D. scandens* Bl." refers to a plant that he elsewhere treats as a variety of *D. strangulatum*, and that was subsequently advanced to specific rank in the *F. B. I.* under the name *D. sinuatum* Bl. MSS.: *Miquel's* second synonym "*D. rubescens* Bl." refers to *D. sequax* Wall., which also occurs in Java (*Kurz* n. 965). But both of *Miquel's* proposals are untenable, for even if it be ultimately found necessary to merge *D. sinuatum* in *D. sequax*, it with still obviously be necessary to keep *D. megaphyllum* apart from both as a very distinct species.

26. *DESMODIUM GANGETICUM* DC.

Add to localities of *F. B. I.*:—PENANG; Pinara Bukit, *Curtis* 2771! **NICOBARS**; *Jelinek* 233!

26b. *DESMODIUM VIRGATUM* Zoll. Nat. en Geneesk. Arch. iii. 58; leaflet membranous or subcoriaceous, oblong entire acute, glabrescent

on the upper surface; corolla 3-4 times the calyx, pod densely clothed with minute hooked hairs. *D. latifolium* Bak. in *Flor. Brit. Ind.* ii. 168 not of DC. *D. latifolium* VAR. *virgatum* Miq. *Flor. Ind. Bat.* i. 247. *D. gangeticum* VAR. *acuminatum* Miq. *Flor. Ind. Bat.* i. 248.

CHITTAGONG; Rangamati, *Clarke!* BURMA; Prome, *Wallich* (*Cat.* n. 5692 G. in part); Pegu, *Kurz!* Shan Hills, *Collett!* PERAK; *Scortechini* n. 1594! DISTRIB. Malay Archipelago.

Stems suberect reaching 3-4 feet high, woody, slightly angular. *Leaflet* oblong 5-6 in. long, thinly clothed beneath with grey hairs. *Racemes* copious ascending 4-8 in. long, slender. *Pod* $\frac{3}{2}$ - $\frac{3}{4}$ in. long, $\frac{1}{12}$ in. broad, 4-6 jointed.

This plant in habit and foliage resembles *D. gangeticum*; in flowers and fruits, *D. latifolium*.

27. DESMODIUM LATIFOLIUM DC.

Delete the synonym *D. virgatum* Zoll.

31. DESMODIUM SEQUAX Wall.

Very nearly related to *D. sinuatum* Blume, to which it bears the relationship that *D. serriferum* bears to *D. tiliaefolium*. The specimens from Mishmi collected by Dr. Griffith apparently include both "species," those at Kew being referred by Mr. Baker to *D. sinuatum*. All the Mishmi specimens at Calcutta belong on the contrary to *D. sequax*, the end-leaflets being narrowed gradually to a point.

32. DESMODIUM CONCINNUM DC.

Add to localities of *F. B. I.*:—BURMA; Bookee ridges, *Kurz!*

The Burmese specimens are referable to VAR. *amœna* Bak., but intermediates from the Khasia Hills are so plentiful that the existence of this variety cannot be satisfactorily maintained.

33. DESMODIUM RETROFLEXUM DC.

Delete the locality "Tenasserim."

34. DESMODIUM CAPITATUM DC.

Add to localities of *F. B. I.*:—PERAK; common, *Kunstler* n. 361! *Scortechini* n. 45! TENASSERIM; *Helper*.

35. DESMODIUM GRIFFITHIANUM Bth.

Add to localities of *F. B. I.*:—BURMA; Chin Hills, *King's Collectors!*

38. DESMODIUM POLYCARPUM DC.

Some of the forms included by Dr. Wight and Prof. Walker-Arnott in this species are at least varietally distinct, notably that issued by Dr. Wallich as *D. ovalifolium*, in which the leaflets are narrowed to an acute apex and have sometimes a truncate or even subcordate base. This form is plentiful in Tenasserim, the Andamans, the Malay Peninsula and Sumatra. The *D. polycarpum* of the *F. B. I.* is rather a group of forms aggregated for convenience, than a well-defined species. The object of the aggregation is readily appreciable: it will be noticed, however, that the reasons for adopting it are the reverse of those made use of in the similar *D. triquetrum* group. There, all the forms whose foliage happens to be similar are grouped together in spite of their having somewhat different flowers and totally different fruits. Here, a number of forms with flowers and fruits that are not

easily distinguishable are brought together in spite of very great and apparently constant differences in foliage. Under this mode of treatment, if consistently applied, *D. sequax* and *D. sinuatum* should have been united, as also should *D. serriferum* and *D. tiliaefolium*, and again *D. reniforme* and *D. oblatum*.

40. *DESMODIUM ROTUNDIFOLIUM* Bak.

41. *DESMODIUM PARVIFLORUM* Bak.

These two species do not accord at all well with the generic definition of *Desmodium*, and are more conveniently referred to *Alysicarpus*, in which they were originally placed by Dalzell.

42b. *DESMODIUM BIRMANNICUM* Watt; shrubby, suberect, leaflets 3, pedicels long, spreading or deflexed, bracts large, flowers and joints of pod small. *D. oblongum* Kurz in *Journ. As. Soc. Beng.* xlv. pt. 2. 226, 229 not of Wall.

BURMA; Pegu, rather frequent, Kurz n. 1677 bis. ! 2532 !

A suberect undershrub with woody slightly angular slender branches, sparingly clothed upwards with longish adpressed whitish hairs. *Petiole* $\frac{1}{2}$ in.; leaflets membranous elliptic, sparingly clothed with adpressed silky hairs on both surfaces, green above, glaucescent beneath; end-leaflet $1\frac{3}{4}$ in. long, 1 in. across, its petiolule $\frac{1}{4}$ in. long; lateral almost sessile 1 in. long. *Racemes* in laxly spreading terminal panicles a foot long or more; bracts large membranous subpersistent ovate-acuminate; pedicels $\frac{1}{2}$ in. long, almost glabrous. *Calyx* $\frac{1}{2}$ in., teeth acuminate twice as long as the tube. *Corolla* under $\frac{1}{4}$ in. *Pod* $\frac{1}{2}$ – $\frac{3}{4}$ in. long, $\frac{1}{8}$ in. broad, minutely puberulous, splitting throughout along the lower suture; joints 4–6, only occasionally separating transversely.

A very distinct species which Mr. Kurz at first appears to have considered a variety of *D. polycarpum*, but which he afterwards treated and issued as *D. oblongum*. Dr. Watt, who has placed a MSS. description of the plant in Herb. Calcutta, has, however, very justly proposed to treat it as a species. It is most nearly related to *D. polycarpum*, but the lax panicles, very long pedicels and very differently dehiscent pods, amply distinguish it.

44. *DESMODIUM RENIFORME* DC.

Very nearly, perhaps too nearly, related to this is *D. oblatum* Bak.

45. *DESMODIUM HETEROPHYLLUM* DC.

This seems to be the representative in Indo-China and Malaya of *D. triflorum*. It occurs, but is rare, in S. India and Ceylon, while it is extremely common, as an indigenous species, in Burma, the Andamans and Nicobars, Tenasserim and the Malay Peninsula. *D. triflorum*, which is so common in India, is rare in Burma, and in the Andamans and Malaya occurs only sparingly about the various settlements, with all the appearance of being a quite recent introduction from India.

49. *DESMODIUM GYROIDES* DC.

Add to localities of *F. B. I.*:—PERAK; Kinta river, *Kunstler* n. 765 !

56. *SHUTERIA* W. & A.

1. *SHUTERIA VESTITA* W. & A.

Add to localities of *F. B. I.*:—DAPHLA HILLS; *Lister* ! NAGA HILLS;

Prain! MANIPUR; *Watt!* BURMA; Poneshee, *J. Anderson!* North Shan States, *Gatucree!* South Shan States, *King's Collectors!* Karen Hills, *Brandis!* Pegu, *Kurz!* TENASSERIM; on Moolyet, 5000 feet, *Gallatly!* DISTRIB. Java (*Kurz* 1103!)

The specimens from all these localities and from those mentioned in the *Flora of British India* agree exactly.

VAR. *glabrata* Bak.; (*S. glabrata* W. & A.) is hardly distinguishable as a variety. Its calyx, even in Wight's original authentic examples, is not at all glabrescent, and the leaflets, though elsewhere glabrous, have a few hairs on the main-nerves beneath. None of Simons' Khasia specimens at Calcutta belong to this variety; of sixteen different gatherings from the Assam Hills preserved in Herb. Calcutta, every specimen belongs to typical *S. vestita*.

The two other varieties of the *F. B. I.* are founded on plants that are specifically quite distinct from *S. vestita*.

1b. *SHUTERIA DENSIFLORA* Benth. in *Pl. Jungh.* 232. *S. vestita* VAR. *densiflora* Bak. in *Flor. Brit. Ind.* ii. 182.

GARHWAL; KUMAON; NEPAL. C. INDIA; Pachmarhi, *Duthie!*

This species is very distinct from *S. vestita*, to which it has been reduced in the *Flora of British India*. It is easily recognised by its glabrous pods and by the more horizontal, early-forking secondary nerves of its larger leaflets.

2. *SHUTERIA HIRSUTA* Bak. *Amphicarpæa ferruginea* Herb. *Ind. Or. H. f. & T. not of Benth.* *Pueraria anabaptista* Kurz in *Journ. As. Soc. Beng.* xlv. pt. 2. 253.

Substitute for localities of *F. B. I.* :—

SIKKIM; very common, *Hooker!* *Anderson!* *Clarke!* *Gamble!* BOOTAN; *Clarke!* KHASIA; *fide* Baker in *F. B. I.* BURMA; Chin Hills, *King's Collectors!* near Bhamo, *J. Anderson!* Shan Hills, *Collett!* *Fulton!* *King's Collectors!* Pegu, *Kurz!* Karen Hills, *Mason!* TENASSERIM; at Lathorgee, 2500 feet, *Gallatly!* DISTRIB. Sumatra (*Forbes* n. 1240!)

Mr. Kurz has distinguished two varieties which differ from each other exactly as *Shutertia vestita* proper and its VAR. *glabrata* do from each other, and are therefore hardly worthy of being distinguished. The writer, to avoid confusion, here follows the *F. B. I.* in keeping this species in *Shutertia*, to which it is referred on account of the axillary stamen being quite free from the others. But with the exception of this single character the plant is altogether a *Pueraria*, and as the definition of *Pueraria* in the *Genera Plantarum* admits species exhibiting this character, it will no doubt ultimately be necessary to readopt the view held by Mr. Kurz.

3. *SHUTERIA FERRUGINEA* Bak.

This has recently been collected again in Nepal by Dr. Scully, and an examination of his and Dr. Wallich's original specimens leads the writer to think that Mr. Baker's view as to its generic position may be correct; Mr. Kurz, however, did not assent to it. There appear to be two varieties:—

a. typica; bracts deciduous. *S. ferruginea* Bak. in *Flor. Brit. Ind.* ii. 182. NEPAL; on Sheopore, *Wallich* n. 5516! *Scully* n. 121! SIKKIM; *Kurz!*

b. VAR. *bracteosa*; bracts persistent. *S. bracteosa* C. B. Clarke MSS. *Pueraria strobilifera* Kurz MSS.

SIKKIM; Clarke n. 13493! KHASIA; G. Mann! Collett! Clarke n. 40383!

Both Mr. Brace and Mr. Clarke have independently noted their belief that this plant is a species of *Shutteria* distinct from any yet described, and in this they only share an opinion noted at a still earlier date by Mr. Kurz who, however, placed it, as he did *S. hirsuta*, in *Pueraria*.

The calyx-teeth of the Sikkim plant are rather shorter than in genuine *S. ferruginea*, but its bracts are exactly like those of the Khasia plant, in all three gatherings of which it is impossible to find a floral character that will separate the form from the Nepal one. None of the gatherings of either variety has ripe fruits and in their absence the writer has not ventured to follow Mr. Clarke and the other botanists whose opinion is quoted, in giving it specific rank. Should its validity as a species be ultimately established, the plant, if accepted as a *Shutteria*, will be known as *S. bracteosa* Clarke; should it prove a *Pueraria*, it will be *P. strobilifera* Kurz.

4b. *SHUTERIA INVOLUCRATA* W. & A. *Prodr.* 207. *S. vestita* VAR. *involutrata* Bak. in *Flor. Brit. Ind.* ii. 182.

NORTH-WEST HIMALAYA and NEPAL; common.

This species is quite distinct from *S. vestita*; it is very closely related, however, to *S. suffulta* Bth., which is the representative form in Burma and which might be reduced to *S. involutrata*, as a variety, with rather more justice than *S. densiflora* can possibly be to *S. vestita*.

58. GLYCINE LINN.

1. GLYCINE JAVANICA Linn.

Add to distribution:—Sumatra (*Forbes!*)

2. GLYCINE PENTAPHYLLA Dalz.

Recent specimens of this from Canara, collected by Mr. Talbot, have all the leaves 7-foliolate.

3. GLYCINE HISPIDA Maxim. *Mel. Biol.* ix. 70 (1873). *Soja hispida* Moench; DC. *Prodr.* ii. 396. *Glycine Soja* Benth. in *Journ. Linn. Soc.* viii. 266; Bak. in *Flor. Brit. Ind.* ii. 184, not of Sieb. & Zucc. THE SOY BEAN.

Mr. Maximowicz in 1873 pointed out that *Glycine Soja* S. & Z. is not the cultivated "Soy," but is the wild species that was subsequently redescribed by Regel and Maack as *Glycine ussuriensis*. For this reason Mr. Maximowicz suggested the use of the name *Glycine hispida*, since Moench had named the "Soy" *Soja hispida* and because that name had become almost classical owing to its use in the *Prodromus*. As Sir J. D. Hooker and Mr. Jackson have adopted Mr. Maximowicz' suggestion in their *Index Kewensis*, and as Mr. Duthie has also followed it in his *Field and Garden Crops*, it is necessary to indicate the fact here. There is, however, no doubt that the "Soy" is Roxburgh's *Dolichos Soja* and it is almost equally certain that it is *Dolichos Soja* Linn.; it would therefore, in the writer's opinion, be far better to retain the name *Glycine Soja* for our plant, citing as our authority Bentham in *Journ. Linn. Soc.* viii. 266, and allow the name *G. ussuriensis* to be substituted for that of the wild species previously named *G. Soja* by Siebold and Zuccarini.

Mr. Baker says of the Soy, 'often cultivated'; this might lead to the supposi-

tion that it is a wild species in India. This it most certainly is not; even as an escape it is of rare occurrence. In connection with this it may be mentioned that in one of the few unequivocal instances of 'escape' among Herb. Calcutta examples, (specimens collected by Mr. Kurz on the banks of the Ganges at Sahebganj) the plant, instead of having suberect, has long trailing stems; but for their greater hispidity the specimens might well pass as representing the wild *G. ussuriensis*. Very probably, therefore, Mr. Maximowicz' suspicion that the Soy is only a cultivated variety of the Ussuri plant may be correct.

59. TERAMNUS Sw.

2. TERAMNUS FLEXILIS Bth.

Add to synonyms of *F. B. I.*:—*Glycine oxyphylla* Grah. in Wall. Cat. 5522. *Galactia?* *oxyphylla* Bth. in *Plant. Jungh.* 233. *Teramnus oxyphylla* Kurz in *Journ. As. Soc. Beng.* xlv. pt. 2. 254.

60. MUCUNA ADANS.

The genus *Mucuna* Adans. is admittedly the same as the genus *Stizolobium* Pers.; the name given by Adanson in 1763 is therefore much older than that used by Persoon in 1807. By Persoon's own showing, however, the name *Stizolobium* did not originate with him but was first used by P. Browne in his *History of Jamaica* in 1756. There seems then, at first sight, as Dr. Otto Kuntze remarks (*Rev. Gen. Plant.* v. 206) no reason why the name *Stizolobium* should be suppressed. Dr. Kuntze has therefore proposed to recognise our genus *Mucuna* as *Stizolobium* P. Br.; this gives him the opportunity of enumerating all the species hitherto known, except those described by Persoon, as Kuntzean species.

But the subject bears closer examination. It is to be noted that the name *Stizolobium* was applied by Browne exclusively to species with seeds that have a small hilum. The only species of *Mucuna* (as now understood) with seeds having a large annular hilum, that Browne knew, was treated by him as the type of a distinct genus which he named *Zoophthalmum*. Adanson, it is true, in his generic description ascribes to the genus as a whole the seeds characteristic only of Browne's *Zoophthalmum*, but his citations show that he included in it one plant belonging to *Zoophthalmum* and another plant belonging to *Stizolobium*. There is therefore no doubt that the oldest name for the genus as a whole is, as De Candolle in *Prodr.* ii. 404 has indicated, the name *Mucuna* Adans. Persoon used the name *Stizolobium*, not in the sense of P. Browne, but as the precise equivalent of *Mucuna* Adans. And Kuntze's remark that Bentham and Hooker in the *Genera Plantarum* "incorrectly" attribute the name *Stizolobium* to Persoon is, to say the least, disingenuous. If the two "genera" of P. Browne are to be considered, as Kuntze apparently agrees to consider them, only parts of one genus, then the oldest name for that conjoint genus is *Mucuna* Adans. To quote as the name of the enlarged genus the word *Stizolobium* and to give as the authority for the name in this sense the reference by P. Browne, is to say and to claim something quite other than was said or claimed by the author of the name. Persoon can be quoted as the authority for the word in precisely this sense, but when quoted on Persoon's authority the name is not so old as the name *Mucuna*.*

* One may ask why, while he was about it, Dr. Kuntze did not try to revive the name *Parrana* of Rumphius, which is, no doubt, an older name for a species of *Mucuna* than any that Kuntze mentions.

If this hunting for prior names is to be made a pastime, which it appears to have become with a number of botanists who, if the truth must be told, mostly hold appointments wherein they are paid to do work far other and far more useful, then let the game be played, as games should,—fairly. When priority-mongers cease to be disingenuous,—when they cease to put into the mouths of authors expressions of opinion that the authors themselves did *not* utter, and would probably most strongly repudiate,—serious botanists, who are content to use nomenclature as a working-tool and not as a plaything, will be able to meet them halfway and to help in the task of bringing order out of a chaos that, after all, is largely of their own making. This much, however, is certain; if good is to be done, it must be done by men of greater judgment than any who as yet have taken it upon themselves to criticise the nomenclature codified in De Candolle's *Prodromus*, in the *Genera Plantarum* of Bentham and Hooker, or in Asa Gray's *Manual*.

Turning from this profitless discussion to the species of *Mucuna* themselves, one finds that various groupings of these have been proposed from time to time. There are two very natural groups within the genus, readily determined by the nature of the seeds. In one group, which exactly corresponds to *Stizolobium* P. Br., the small oval seeds have a small lateral oblong-linear hilum; in the other, which equally exactly corresponds to *Zoophthalmum* P. Br., the large discoid seeds are provided with a large hilum that extends round from two-thirds to three-fourths of the periphery of the disc. So very natural is the distinction between the two groups that the writer, though he does not here venture to formally propose the step, is quite convinced that, were the genus adequately monographed, it would be found necessary to recognise in them two separate genera; when this happens the bibliographical discussion will end, of its own accord, in the restoration of both the generic names proposed by P. Browne.

In *Prodromus* ii. 405, De Candolle has practically recognised the groups in question but has only treated them as separate sections; he has used to designate them, in a *sectional* sense, the two generic names of P. Browne. M. De Candolle did not, however, note the error into which M. Adanson had fallen regarding the seeds; like Adanson, he has attributed to all the species a circumferential hilum. He has thus been led to use, in distinguishing his two sections, a purely external and, as we now know, a somewhat variable character,—the presence or absence of plaits and furrows on the sides of the pods. This has led to his inclusion in *Stizolobium* of one species (*M. gigantea*) that most certainly does not belong to the section.

In the *Genera Plantarum*, for the first time, Bentham and Hooker made full use of the natural character derived from the seeds. At the same time, however, they continued to employ the character used by M. De Candolle. They have consequently been led to recognise three sections:—

1. *Citta*; including those species with a circumferential hilum and with plaits across the face of the pods.
2. *Stizolobium*; including all species with a small lateral hilum.
3. *Carpopogon*; including those species with a circumferential hilum but without plaits across the face of the pods.

This arrangement has obviously the great disadvantage of intercalating the very distinct and very natural group *Stizolobium* between two artificially separated portions of another equally natural group, similar in rank and importance to *Stizolobium*.

The name *Citta* is one that had been used generically by Loureiro, but it is not

clear why its use is preferred to that of *Zoophthalmum*; the limits of § *Zoophthalmum* DC. and § *Citta* Bth. & Hk. f. are exactly the same. The name § *Stizolobium* is used as in DC. *Prodr.*, except that the species *Mucuna gigantea* is very properly excluded from the section; one of its varieties is placed in § *Citta*, while another variety of the same species forms, along with *M. macrocarpa*, the § *Carpopogon* of Bth. & Hk. f. The name *Carpopogon* is one that had been used in a generic sense by Roxburgh as the exact equivalent of *Mucuna* Adans. or *Stizolobium* Persoon. Of the convenience of the *Genera Plantarum* arrangement there can be no question, and the writer would only propose to deviate from it to the extent of treating *Stizolobium*, in the meantime, as a subgenus rather than as a section; the other two sections may be considered as together forming a second subgenus *Zoophthalmum* which, like *Stizolobium*, will probably at an early date be once more treated as generically distinct.

In the *Flora of British India* the arrangement advocated by Messrs. Bentham and Hooker has been rejected entirely. The genus is subdivided into four groups, to each of which is given the rank of a subgenus, and though, for three of the proposed subgenera, the sectional names used by Bentham and Hooker are retained, the definition and the limits of each of the three are altered. The section *Citta* is divided into two subgenera, AMPHIPTERA Bak. and CITTA "Lour." The first of these is distinguished by having wings down the sutures as well as plaits across the pods, while the second has plaits but no wings. This subdivision does not possess the advantage of being natural. *Mucuna monosperma*, placed in CITTA, instead of being wingless down the suture as is postulated in the definition given of that subgenus, has wings that are sometimes as broad as those of *M. imbricata* which is the type of AMPHIPTERA. The only actual difference between the wings in the two species is that in *M. monosperma* the plaits extend from the surface of the body of the pod quite across the wings; in *M. imbricata* the plaits do not extend quite across the wings. The difference then, in place of being a subgeneric one, is so slightly a difference of degree as to be, if taken alone, barely specific. The pods of *M. atropurpurea* and also of *M. biplicata*, which is included in *M. atropurpurea* in the *F. B. I.*, do appear, when cursorily examined, to be wingless. But closer inspection shows that they are winged, exactly as in *M. monosperma*, with the transverse plaits continued across the wings, only the wings are here lobed to their bases between each pair of plaits.

The subgenus CARPOGON is confined to species broadly winged down both sutures, thus limiting the subgenus to the single species *M. gigantea*. The *Genera Plantarum* section of this name includes species that are no more than ribbed down each side of the suture and thus, naturally enough, includes *M. macrocarpa*, which has long woody pods and has seeds with a circumferential hilum. But *M. macrocarpa*, in spite of its circumferential hilum, is put in *Stizolobium* by the *F. B. I.* thus again rendering the definition given in the *Genera Plantarum* inapplicable, since that restricts to the section *Stizolobium* those species that have a small hilum to the seeds. Most unfortunately Mr. Taubert, in the authoritative *Natürlichen Pflanzenfamilien*, has adopted the quite untenable divisions proposed in the *F. B. I.* For not only is there no doubt that Bentham and Hooker are right in accommodating *M. macrocarpa* and *M. gigantea* in the same natural group, there is now equally no doubt that *M. gigantea* cannot be separated from the natural group containing *M. imbricata* and *M. monosperma*. The writer has collected, in the Andamans, specimens of *M. gigantea*, some of the pods of which have ridges across the face in exactly the position of the plaits in the other species.

Mr. Baker quotes Persoon as the author of his subgenus *STIZOLOBIUM*. But to Persoon *Stizolobium* was a genus including *all* Baker's subgenera. So he quotes Roxburgh as the author of the subgenus *CARPOPOGON*; the same objection applies here. The citation of Loureiro as the authority for *CITTA* is however particularly unhappy, for it is in the highest degree probable, from a study of Loureiro's description and from the knowledge we now possess of its distribution and characters, that *Mucuna imbricata*, which is the basis of *AMPHIPTERA*, is the species described by Loureiro as *Citta nigricans*; specimens of what is undoubtedly *M. imbricata*, noted as having white flowers with purple spots, have recently been sent from the Shan Hills to Herb. Calcutta; there is, therefore, not one character now left which militates against the identification of Loureiro's plant with *M. imbricata*. In any case since Loureiro's plant had 3-seeded pods, it cannot possibly have been either *M. monosperma* or *M. atropurpurea*, which constitute the *CITTA* of the *F. B. I.*

Subgen. I. *ZOOPHTHALMUM*. Perennial climbers; seeds large flat, with a large hilum extending round the greater portion of their circumference.

§. *CITTA*. Pods plaited across their faces.

1. *MUCUNA IMBRICATA* DC.

Add to localities of *F. B. I.*:—NORTH-WEST HIMALAYA; *Vicary! A. O. Hume! King!* MANIPUR; *Watt!* BURMA; Pegu, *Brandis!* SHAN HILLS; "flowers white and purple," *King's Collectors!* ANDAMANS; common, *King's Collectors!*

Bracteoles at base of calyx in bud similar to bracts but many times smaller and more deciduous.

Nearest to this is perhaps *Mucuna Junghuhniana* [*Stizolobium Junghuhnianum* Kuntze (*Rev. Gen. Pl.* i. 208)] from Java, which differs in being strigosely hirsute and in having pods with plaits extending partly across the wings. The plant referred to by Kurz (*Journ. As. Soc. Beng.* xlv. pt. 2, 246) as a new species near *M. atropurpurea* is *M. imbricata*; Mr. Kurz has himself made the reduction in Herb. Calcutta.

2. *MUCUNA MONOSPERMA* DC.

Add to localities of *F. B. I.*:—ANDAMANS; very common everywhere in the interior jungle. *DISTRIB.* Sumatra.

Bracts at base of pedicels small triangular, much smaller and much more early deciduous than the linear bracteoles exceeding the bud. One of the Calcutta examples of Wall. Cat. 5623 is *Mucuna imbricata*, the other is a mixture of *M. imbricata* and *M. macrocarpa*; there is no *M. monosperma* whatever on either sheet. Wall. Cat. 5622 must be equally confused; Mr. Baker finds that the plant represented is *M. monosperma*; at Calcutta on the other hand 5622 is *M. gigantea*.

3. *MUCUNA ATROPURPUREA* DC. *Zoophthalmum atropurpureum* Prain MSS.

Delete from localities of *F. B. I.*:—MALACCA.

The Malacca plant referred to *M. atropurpurea* in the *F. B. I.* belongs to a distinct species and proves to be *M. biplicata* Teysm. & Binnend.

3a. *MUCUNA BIPPLICATA* Teysm. & Binnend. in *Cat. Hort. Bog.* 261; leaflets glabrous, racemes short-peduncled close, upper calyx-lip very

short truncate, pod two-seeded twice as long as broad, plaits with reflexed double-margins. *Prain, Journ. As. Soc. Beng.* lxvi. 2. 66. *M. atropurpurea* Bak. in *Flor. Brit. Ind.* ii. 186 (as to the Malayan plant only). *Zoophthalmum biplicatum* *Prain* MSS.

MALACCA; *Maingay*. PERAK; very common, *Kunstler*! *Scortechini*! *Wray*! PENANG; *Curtis*! DISTRIB. Sumatra (*Forbes*). Borneo (*Teysmann*).

A slender woody climber 30-40 feet long, with glabrous branches. *Leaflets* papery, dull-green, ovate-oblong cuspidate, 6-8 in. long, 5 in. across. *Racemes* 2 in. long, usually branching at the very base, occasionally further up; bracts and bracteoles much as in *M. monosperma* but the latter much smaller and shorter than the buds. *Calyx* greenish-brown, '35 in. long, all the teeth minute densely bristly. *Corolla* dark-purple, 1'75 in. long, keel abruptly incurved at end, wings 1'25 in. long, standard '75 in. wide. *Pod* hardly stipitate, 3'5 in. long, 1'75 in. wide; plaits very close; bristles pungent, abundant, brown.

§ CARPOPOGON. *Pods* not plaited across their faces.

3b. *MUCUNA ACUMINATA* *Grah.* in *Wall. Cat.* 5621; *Prain, Journ. As. Soc. Beng.* lxvi. 2. 67. *Zoophthalmum acuminatum* *Prain* MSS.

Add to localities of *F. B. I.*:—PERAK; Kinta, *Kunstler*! SINGAPORE; Chan Chu Kang, *Ridley*! DISTRIB. Java (*Forbes*).

This species is referred to in the *Flora of British India* under *M. imbricata*. Its pod has now been reported and is like that of *M. gigantea*; the species is therefore a member of § *Carpopogon* Bth. & Hk. f. It further resembles *M. gigantea* in having a pale-green corolla. From *M. gigantea* it is however easily distinguished by its short corymbose inflorescence, its long calyx-teeth, its much larger flowers, and its large boat-shaped floral bracts.

4. *MUCUNA GIGANTEA* DC. *Zoophthalmum giganteum* *Prain* MSS.

Add to localities of *F. B. I.*:—BENGAL; Sundribuhs, very common, *Kurz*! *Heinig*! CEYLON; *Walker*! TENASSERIM; Tavoy, *Gomez* (*Wall. Cat.* n. 5622)! MALAY PENINSULA; Pahang, *Ridley*! PERAK; *Scortechini*!

This species is very common in the Andamans where it has been collected not only by *Kurz* but by *Liebig*, E. H. Man, and the writer, who has obtained it on outlying islands like Narcondam, the Coco Group and Little Andaman, as well as on the main island. The locality "plains of Western Peninsular," given in the *F. B. I.*, the writer has been unable to authenticate. The only locality mentioned by *Rheede*, whose figure of the plant is excellent, is one near the sea in Malabar; he says it occurs "in other places" than the one mentioned but does not say they are inland ones. The only place where *Wight* gathered it was at Negapatam on the Coromandel Coast; in *Hooker's Botanical Miscellany* it is said to grow only near the sea.

The writer, who has given some attention to the various *Mucunas* in the field, has always found *M. gigantea* a strictly littoral species elsewhere and more evidence is necessary before its inland occurrence in the Indian Peninsula can be credited. Mr. E. H. Man notes on a specimen that this, which the Andamanese know as *chákunda*, is always found on the borders of salt-creeks and is in this respect quite unlike *M.*

monosperma, which the Andamanese know as *pûlé-da* and which never grows near salt-creeks but always in the interior jungle. The lianes of *M. gigantea* form indeed one of the most striking features of the muddy margins of our Indian Mangrove-swamps. The writer when in the Great Coco was at pains to obtain one entire plant, the following were its measurements:—*Diameter* of main stem, close to the mud, 5 in.; at 4-6 feet from the mud there issued, from latent buds, 4 of the characteristic umbelliform pendent racemes of the species, with slender peduncles 8-15 in. long. The first branch was at a distance of 50 feet from the root, the first leaf was at a distance of 205 feet from the mud, about 200 feet from the only flowers on this particular plant; the leafy branches, only 15 in. in diam., extended 25-30 feet further. This feature of flowering from old wood has been met with in *Mucuna monosperma* as well.

During another journey the writer collected, on Little Andamans, specimens of *M. gigantea* with pods ridged, though not plaited, across the face, thus unfortunately invalidating the distinction between the "subgenera" *Amphiptera* and *Carpopogon* of the *F. B. I.*

5. *MUCUNA MACROCARPA* Wall.

Add to synonyms of *F. B. I.*:—Wall. *Pl. As. Rar.* i. 41. t. 47; Kurz in *Journ. As. Soc. Beng.* xlv. pt. 2. 245. *Mucuna* sp. Coll. & Hemsl. in *Journ. Linn. Soc.* xxviii. 47. *Zoophthalmum macrocarpum* Prain MSS.

Add to localities of *F. B. I.*:—UPPER BURMA; Poneshee, *J. Anderson*! Shan Hills plateau, 4000 feet, *Collett*! Pegu; in pine forests on the Bookee ridge, common, *Kurz*!

The Burmese plant always has the lowest calyx-tooth longer than in the Nepal and Sikkim plant. In specimens collected by the writer in the Khasia hills, however, the calyx is exactly as in those collected by Dr. J. Anderson at Poneshee and by Sir Henry Collett in the Shan hills. The pod is so exactly alike in the Burmese and in the Himalayan plants that the writer, instead of being able to adopt the suggestion of Sir Henry Collett and Mr. Hemsley that the Burmese one may be a new species, is not inclined to treat it as even varietally distinct.

The perennial stems and the large circumferential hilum of the seed, mark the species as undoubtedly a *Zoophthalmum* not a *Stizolobium*.

Subgen. II. *STIZOLOBIUM*. Stems above ground annual; seeds small ovoid with a small lateral hilum.

6. *MUCUNA BRACTEATA* DC. *Stizolobium bracteatum* Kuntze Rev. Gen. Plant. i. 208.

The Assam specimens recently issued by Mr. Clarke as *M. exserta* belong to this species.

8. *MUCUNA CAPITATA* W. & A. *Stizolobium capitatum* Kuntze Rev. Gen. Plant. i. 207.

This is not confined to the foot of the Himalayas; though found in that area it is less common there than in the forests of Central India and Chota Nagpur. The racemes of this are not always short, nor are the racemes of *M. pruriens* always elongated; the species are only distinguishable by their pods. These last are, however, as Mr. Baker points out, very different.

61. APIOS MENCH.

APIOS CARNEA *Bth.*

Add to localities of *F. B. I.*:—BURMA; Chin Hills, *King's Collectors* !
Shan Hills, at Fort Stedman, *King's Collectors* !

62. ERYTHRINA LINN.

1. ERYTHRINA INDICA *Lamk.*

This is, save when planted, a purely littoral species and is common in the jungles along the sea-face from the Sundribuns at the head of the Bay of Bengal down the Burmese and Tenasserim coasts, occurring also along the shores of the Andamans and Nicobars; it is as plentiful in remote outlying islets like Narcondam as it is in the larger ones. In all probability it never occurs inland except as an introduced tree.

2. ERYTHRINA STRICTA *Roxb.*

Add to localities of *F. B. I.*:—ASSAM, MANIPUR, CHITTAGONG,
BURMA, very common.

This species is, on the other hand, apparently altogether an inland one; it is, to judge by the number of undoubtedly wild specimens sent to Herb. Calcutta, quite as common in Indo-China as it is in India.

In the *F. B. I.*, *E. spathacea* Wall. (Lith. Cat. n. 5965) is cited as *E. indica*. In the Catalogue Dr. Wallich only wrote "*E. spathacea* ?"; on the sheets themselves he wrote "*E. stricta* Roxb.;" further, he queries in the Catalogue whether the sheets marked 5965 B. and 5965 C. are the same as 5965 A. Sheets B. and C. came from Kamaon and Hardwar respectively; 5965 C. is not represented in Herb. Calcutta and the writer cannot therefore express any opinion respecting it. But sheet 5965 A. at Calcutta, which came from a tree grown in the Calcutta garden, is as the ticket upon it states, *E. stricta* and not *E. indica*, and sheet 5965 B. at Calcutta, collected in Kamaon by Mr. Blinkworth, is *E. suberosa* Roxb.

3. ERYTHRINA RESUPINATA *Roxb.*

This interesting little species was found again in 1884 by Mr. C. B. Clarke on Parasnath.

5. ERYTHRINA SUBEROSA *Roxb.*

VAR. *glabrescens*; leaflets as in type, but glabrescent beneath at an early stage.

NORTH-WEST HIMALAYA; Kamaon, *Blinkworth* ! Bashahr, *Lace* ! SIKKIM; *King* ! BURMA; Pegu, *Adamson* ! Brandis ! Kurz ! Shan Hills, *King's Collectors* !

This is, at first sight, very unlike *E. suberosa* owing to the absence of tomentum from the under surface of the leaves; the leaflets, however, are in shape and size exactly as in typical *E. suberosa* while the flowers, pods and seeds are indistinguishable. In Langkawi, off the Kedah Coast, Mr. Curtis collected one specimen of an *Erythrina* as to flowers exactly like this plant but with intensely prickly branchlets,—one of the features of all the varieties of *E. suberosa* is that the branchlets are almost unarmed. In the absence, however, of leaves and of fruits it is not possible to identify Mr. Curtis' plant. Very near to this, if not actually the same species, is *E. microcarpa* Koord. & Val. from Java, of which, however, the writer has only seen leaves and pods, not flowers.

7. *ERYTHRINA LITHOSPERMA* Miq.

Add to localities of *F. B. I.*:—*PEGU*; common, *Adamson!* *Brandis!* *Kurz!* *SHAN HILLS*; *Terai, Collett!* *TENASSERIM*; *Makana*, 2000 feet elev., *Gallatly!* *PERAK*; at *Kinta, Kunstler n. 7103!* *PENANG*; *Wallich!* *SINGAPORE*; *Hullett n. 80!* *DISTRIB.* *Sumatra (Teymann)*; *Java*, common.

There is no doubt as to the accuracy of Mr. Kurz's statement that the Indo-Chinese plant is exactly the same as *E. sumatrana* Miq., from Sumatra, of which there are authentic specimens in Herb. Calcutta. But the Java plant described as "*E. lithosperma* Bl." by Miquel, to which Mr. Baker has referred the present species does not differ even as a variety from the plant of Sumatra, the Malay Peninsula and Burma. It must, however, be recollected that Mr. Kurz has noted that *E. lithosperma* Bl., as described by Miquel, is not the true *E. lithosperma* of Blume which, Kurz says, was a plant introduced to Java from Mauritius. Messrs. Koorders and Valetton, in their recently issued Java Herbarium, issue the Java form of the species under review as *E. lithosperma*. They have, however, issued it as "*E. lithosperma* Miq.," not as "*E. lithosperma* Bl."—their reason for this being that Blume's *E. lithosperma* is only *E. indica*, and that the name is thus left free, but on Miquel's authority, not on Blume's, to designate our species.

Erythrina holosericea Kurz, *Journ. As. Soc. Beng.* xlii. pt. 2. 69, the validity of which Mr. Baker has already doubted, is a spurious species manufactured by combining in one description the characters of the flowers of *E. ovalifolia* and of the leaves of *E. lithosperma* which had been sent to Herb. Calcutta, by an officer of the Indian Forest Department, under the idea that they belonged to the same tree. The citation of this composite "species" as *Coraliodendron holosericeum* by Kuntze in that author's *Rev. Gen. Plant.* i. 172, in a passage where he takes the opportunity to (as the writer thinks) unnecessarily resuscitate an obsolete generic name, might lead to the belief that Kuntze had taken the trouble to verify the validity of the Kurzian species, as to the existence of which Baker had justly expressed a doubt. Obviously Kuntze has done nothing of the kind, and any one but a botanist would be inclined to conclude, from a citation such as this, that the object of much of the *bouleversement* effected by priority-mongers is less the restoration of generic names that may have been improperly suppressed than the search for opportunities of posing as the authorities for species of whose characters they are ignorant.

63. *STRONGYLODON* VOGEL.1. *STRONGYLODON RUBER* Vogel.

Add to localities of *F. B. I.*:—*ANDAMANS*; very common, *Prain!* *King's Collector's!*

64. *GRONA* LOUR.1. *GRONA GRAHAMI* Benth.

Add to localities of *F. B. I.*:—*BENGAL*; *Manbhum, Campbell!*

65. *GALACTIA* P. BR.1. *GALACTIA TENUIFLORA* W. & A.

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It would, for the purposes of the field-botanist, be better to recognise some of the "varieties" of this species as distinct. The following appears to the writer to be the most satisfactory arrangement.

a. *Galactia tenuiflora* W. & A. Prodr. 206.

VAR. *typica* = *G. tenuiflora* proper in *F. B. I.*

VAR. *minor* = var. 2. *minor* Bak. in *F. B. I.* (*G. tenuiflora* VAR. β . W. & A.)

b. *Galactia longiflora* Benth. in *Ann. Wien. Mus.* ii. (1838); Wight, *Icones* t. 482.
= var. 1. *lucida* Bak. in *F. B. I.* (*Glycine lucida* Grah.)

This is very justly kept up in the *Index Kewensis*; by a *lapsus* unavoidable in a work of such magnitude *Glycine lucida*, which is the same thing, is referred not to *G. longiflora* but to *G. tenuiflora*. The *F. B. I.* does not quote Wight's figure or refer to his description.

c. *Galactia villosa* W. & A. Prodr. 207.

VAR. *typica* = var. 3. *villosa* Bak. in *F. B. I.*

VAR. *latifolia* = var. 4. *latifolia* Bak. in *F. B. I.*

No diagnostic marks require to be given, as those given by Mr. Baker could hardly be improved on.

[2. GALACTIA ? OXYPHYLLA Benth. *Pl. Jungh.* 233. *Glycine oxyphylla* Grah. in *Wall. Cat.* 5522. *Teramnus oxyphylla* Kurz in *Journ. As. Soc. Beng.* xlv. pt. 2. 254.]

There is no doubt whatever that this is, as Mr. Kurz says, a *Teramnus*. It is however only *Teramnus flexilis* with the rachis of all the racemes unusually short. In pretty well any plant of *T. flexilis* some of the racemes are to be found abbreviated in this fashion, and by judicious collection both the "species" may be obtained from one plant. In the *Index Kewensis*, pending further research, both names are quoted. The two are, however, based on the same specimen, and *Galactia oxyphylla* must be now treated as a synonym of *Teramnus flexilis*.

67. SPATHOLOBUS HASSK.

1. SPATHOLOBUS ROXBURGHII Benth.

There are two very distinct forms of this species—one with leaves glabrescent beneath, the other with leaves densely silky beneath. The latter was distinguished as *Butea sericophylla* by Wallich, and issued under that name as *Cat.* n. 5541. The specimens obtained along the Sub-Himalayan tracts from Garhwal to Assam, and those from the Chin hills and the Khasia range are of the first form—those of the second form include the specimens from Southern India and those from Tenasserim and Pegu. There is not however a single character of flower or fruit that can be used to separate the forms, and they are not even strictly geographical, for in 1862 Dr. T. Anderson collected at 2500 feet elevation in Sikkim an undoubted example of the common S. India form, and on the other hand Mr. Lawson has recently sent to Calcutta one specimen of the North Indian form from Travancore. In Chittagong and Upper Burma the two forms appear to be equally common and to grow side by side.

The *F. B. I.* "variety" *platycarpa* is not confined to the Concan; specimens with pods as broad as those described have been collected in Central India, in the Sikkim Terai, and in Chittagong, while some of those from Burma have pods $2\frac{1}{4}$ – $2\frac{1}{2}$ in. across.

But there is no difference between the plants bearing the broad and the narrower pods; it is at times possible to collect both "varieties" on different parts of one plant.

1b. *SPATHOLOBUS BRACTEOLATUS* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 76; leaflets subcoriaceous almost glabrous beneath all ovate-lanceolate, flowers small, buds shorter than the narrow-lanceolate bracteoles.

MALAY PENINSULA; Perak, on Gunong Batu Pateh, 3000 feet elev., *Kunstler* n. 8079!

A slender creeper 15-20 feet long with sparsely rusty-pubescent branches. *Petiole* 1·5-2·5 in., rusty-puberulous; leaflets glossy bright-green with minute scattered adpressed rusty-brown hairs on both surfaces, subequal and subsimilar, lateral nerves 8-9 pairs ascending, prominent especially beneath; 8-9 in. long, 3·5 in. across. *Panicles* terminal and axillary 1·5-2 ft. long, branches 4-6 in., rusty-pubescent, pedicels very short; bracteoles 2 in. *Calyx* 15 in., pale-brown pubescent, lower teeth sublinear shorter than tube. *Corolla* rather larger than calyx. *Pod* not seen.

In general appearance this most resembles *S. Roxburghii*, but the flowers are very different; it may perhaps be the same as *S. Roxburghii* var. *denudata* Bak. from Penang, which is not represented in *Herb. Calcutta*. It is quite unlike any other Malayan species.

2b. *SPATHOLOBUS FERRUGINEUS* Benth. *Pl. Jungh.* 238; leaflets coriaceous ferrugineo-pubescent beneath, end one ovate-obtuse, flowers almost medium, calyx densely rusty-pubescent, teeth short, pod sessile narrowed to the tip. *Miq. Flor. Ind. Bat.* i. 204; *Prain, Journ. As. Soc. Beng.* lxvi. 2. 75. *Drebbelia ferruginea* Zoll. in *Nat. en Geneesk. Arch.* iii. 79.

MALAY PENINSULA; Perak, common, *Wray! Scortechini! Kunstler!* PENANG; common, *King! Abrams! Curtis!* MALACCA; common, *Griffith! Maingay! Derry! Goodenough!* SINGAPORE; *Hullelt! Ridley!* *DISTRIB.* Sumatra; Borneo; Java.

A robust woody climber with densely ferrugineo-pubescent branches. *Petiole* 3-4 in.; leaflets dull-green puberulous throughout above, densely beset with spreading hairs and reticulate-venose beneath, at times densely rusty-silky; the bases rather rounded, the end-leaflet 5-6 in. long. *Panicle* 8-10 in.; branches densely rusty-pubescent; pedicels distinct 2 in. long. *Calyx* 2 in. long; teeth deltoid. *Corolla* claret-coloured to dark-blue, 25 in. long, standard as broad as deep, notched at apex. *Pod* as in *S. gyrocarpus*, softly velvety, semi-transparent, 3-5 in. long, 7 in. broad at base, 3 in. wide at seed-bearing tip.

Mr. Ridley has collected twice at Singapore what is apparently a form of this species with the leaves densely silky beneath, thus repeating within *S. ferrugineus* the relationship that within *S. Roxburghii* is borne by *Butea sericophylla* to the typical *Butea parviflora*.

The nearest ally of the species is *S. gyrocarpus*; it is however readily distinguished by its nearly always rather smaller leaves; its always different tomentum, its always larger flowers with much longer pedicels, and its differently shaped, more persistent bracts.

3. *SPATHOLOBUS ACUMINATUS* Benth.

The basis of this species is *Butea acuminata* Wall. (*Cat.* 5443) from Martaban. Since Dr. Wallich first obtained the plant it has been again collected in Martaban by

Dr. Falconer and by Mr. Stoliczka; more recently it has been reported abundantly by Dr. King's plant collectors from the Andaman group.

Mr. Baker finds that *Wall. Cat.* 5907 from Burma, as represented in Herb. Kew, is the same as *Wall. Cat.* 5443. He also is of opinion that *Wall. Cat.* 5908 may likewise be the same species. The latter is not represented in Herb. Calcutta, but in the Calcutta collection *Wall. Cat.* 5907 is the very distinct species here described as *Spatholobus roseus*. Mr. Baker adds that *Wall. Cat.* 9054 from Penang, which is also absent from the Calcutta collection, most probably belongs here, and on the strength of this probability gives Penang as a locality for the species; one objection to this is that, in another place, the *F. B. I.* identifies *Wall. Cat.* 9054 with *Derris thyrsiflora*. There is at Calcutta, however, an example of *Wall. Cat.* 8082, issued by Dr. Wallich as a *Sapindaceous* plant, that certainly is a *Spatholobus* and possibly belongs to this species. But it is strange that no one has collected the plant in Penang since Dr. Wallich's time.

S. purpureus Benth., referred to under *S. acuminatus* is, as Mr. Baker suspects, very distinct. Its fruits have recently been reported by Mr. Talbot.

Mr. Kurz refused to accept, in his *Contributions* to the botany of Burma, the genus *Spatholobus* as distinct from *Butea*; in this there is no doubt that Mr. Kurz was wrong. Moreover, in enumerating *Butea acuminata* he attributes to it "white" flowers, whereas Mr. Baker describes them as being bright-red. Most unfortunately no one has ever recorded the colour of the flowers of true *S. acuminatus*, but in any case, on consulting Mr. Kurz's specimens, it is found that he never himself collected either the true *S. acuminatus* or the true *S. roseus*, and that the specimens on which his *S. acuminatus* is based belong to the two different species here termed *S. squamiger* and *S. riparius*, which are quite distinct from each other and equally distinct both from Wallich's original *Butea acuminata* and Graham's *Pongamia rosea*.

Mr. C. B. Clarke collected in the Khasia Hills in 1871 a plant (*Clarke n.* 14981) that must be nearly related to *S. acuminatus*. Yet to the writer it hardly seems to be that species; its leaflets have longer caudate tips, its stipels are longer, its stipules are different and it is especially unlike *S. acuminatus* in having the twigs hirsute with spreading hairs. As yet this form has not been met with by any other botanist and there are neither flowers nor fruits at Calcutta.

3b. *SPATHOLOBUS PURPUREUS* Benth. ex Bak. in *Flor. Brit. Ind.* ii. 194; leaflets coriaceous, oblong, shortly bluntly cuspidate, rounded at base, the lateral pair obliquely, flowers small, calyx puberulous, teeth oblong-obtuse half as long as tube; pod sessile not much narrowed to the thick tip; wing shining glabrous.

W. INDIA; Canara, *Stocks!* Talbot n. 1630!

A lofty climber with glabrous branches. Petiole 1-3 in. long, leaflets dark-green glabrous, shining on both surfaces, end-leaflets 3.5 in. long. Panicles short, 3-6 in. long, dense; pedicels equalling calyx. Calyx .1 in. Corolla dark-purple, much exerted. Pod 4 in. long, .7 in. across below, .6 in. across at thickened apex, quite glabrous.

Recently specimens of this, in fruit, have been collected by Mr. Talbot at Digghi Ghaut; these show that the species is a very distinct one.

3c. *SPATHOLOBUS SQUAMIGER* Prain; leaflets membranous ovate-acute tip mucronulate, base wide-cuncate, panicles longer than leaves,

bracts at origin large, flowers small, calyx obscurely downy, teeth oblong half as long as tube. *Butea acuminata* Kurz, *Journ. As. Soc. Beng.* xlv. pt. 2. 243 not of Wallich.

PEGU; Kurz 2596!

A large climber, branches glabrous. *Petiole* 1–2 in.; leaflets pale-green, end one 3–4 in. long, 1½–2 in. wide. *Panicle* over a foot long very much exceeding the leaves, the peduncle with a collar of large lanceolate scarious bracts, each ¼ in. long, at its origin from stem. *Pedicels* shorter than calyx. *Calyx* 1 in. long, teeth obtuse. *Corolla* white. *Pod* not seen.

This differs from *S. acuminatus* (which it otherwise closely approaches) in having more numerous and ascending, not almost transverse, lateral nerves; in having, if Mr. Kurz' and Mr. Baker's notes be accurate, white not red flowers; in having leaflets that are not at all cuspidate; and in having much longer panicles whose peduncles arise from woody nodes, the long leaf-scales of which surround their bases.

3d. *SPATHOLOBUS ROSEUS* Prain; leaflets papery, elliptic, shortly widely obtusely cuspidate, rounded at base, glabrous on both surfaces, flowers small, calyx obscurely downy, teeth oblong shorter than the tube. *Pongamia rosea* Grah. in Wall. *Cat.* 5907.

MARTABAN; at Phanoe, on the Salween river, Wallich n. 5907! UPPER BURMA; Kendat, Pruzer!

A large climber, branches glabrous. *Petiole* 4–6 in. long. *Leaflets* pale grey-green, terminal 8 in. long, 4 in. wide, very shining on upper surface, quite glabrous beneath from the beginning. *Pedicels* very short, panicles a foot long, lax, very sparsely flowered. *Calyx* 1 in. *Corolla* rose-coloured three times as long as calyx, limb of standard broader than deep, emarginate. *Pod* not seen.

Perhaps this may prove to be the same as Griffith n. 1678 which is referred to in the *F. B. I.* but which is not at Calcutta; it has a pod 6 in. long. This differs from *S. acuminatus* in the thicker much larger leaflets, with much shorter tips; also in the longer more lax panicles. From *S. crassifolius* it differs in having much broader leaves with more numerous nerves, and in having obtuse, not acute, calyx-teeth; its nearest ally is the next species which has, however, very much thinner leaves with different nervation.

3e. *SPATHOLOBUS LISTERI* Prain; leaflets membranous ovate-acute tip hardly mucronulate, base wide-cuneate, glabrous beneath, panicles shorter than leaves, bracts at origin small, calyx obscurely downy, teeth oblong half as long as tube, pod sessile narrowed at tip, puberulous.

CHITTAGONG; very common, Lister n. 98! n. 293! n. 323! n. 345!

A large climber, branches glabrous. *Petiole* 1–2 in.; leaflets pale-green, end one 6–7 in. long, 3 in. wide. *Panicle* 3–6 in. long, shorter than the leaves, peduncle with a few small scarious bracts at its origin from stem. *Pedicels* shorter than calyx. *Calyx* 1½ in. long, teeth rounded. *Corolla* apparently pink. *Pod* finely downy, 3–5 in. long, 7 in. wide below, 3 in. wide at seed-bearing apex.

Very near to *S. squamiger*, having similar but larger leaves and laxer much shorter panicles that have much smaller and fewer bracts at their point of origin; also very near *S. acuminatus* but with different leaves, rather laxer panicles and a different pubescence on pod.

3f. *SPATHOLOBUS MERGUENSIS* Prain; leaflets very thick and rigid, oblong shortly cuspidate, base rather narrowly cuneate, quite glabrous on both surfaces, panicles rather shorter than leaves, bracts at their origin small, calyx finely downy, teeth triangular half as long as tube; pod not seen.

MERGUI ARCHIPELAGO; *J. Anderson! Proudlock!*

A strong climber, branches glabrous lenticelled. *Petiole* '5-1'5 in., leaflets 4 in. long, 2 in. wide. *Panicle* 3-5 in. long, almost equalling the leaves, peduncles with a few small scarious bracts at its origin from stem. *Pedicels* as long as calyx. *Calyx* '1 in., teeth subacute. *Corolla* claret-coloured.

Very near to *S. Listeri* and *S. roseus*; while resembling these in inflorescence it has a different calyx and very dissimilar leaves. The leaves, though somewhat unlike in shape, have the venation and consistence of those of *S. crassifolius* which species has, however, a totally distinct inflorescence and quite different flowers.

5. *SPATHOLOBUS RIPARIUS* Prain; leaflets thick, very rigid, obovate-obtuse, cuneate at base, lateral slightly obliquely, glabrous above, sparsely shortly puberulous on the nerves beneath, flowers small, calyx obscurely downy, upper and lower teeth oblong, lateral triangular, nearly as long as the tube, pod sessile narrowed to the tip.

TENASSERIM; on Taepo, 5000 feet, *Gallatly! PEGU*; on Tounkye-ghat, *Kurz* n. 1709!

A low spreading tree (*vide* Gallatly) hanging over streams. *Leaflets* very rigid but not so thick as those of *S. crassifolius*, with 6-8 pairs of almost straight, oblique lateral nerves much raised on both surfaces, cross reticulations beneath very distinct; shining above, dull beneath. *Panicles* a foot long, pedicels shorter than calyx. *Calyx* '1 in. *Corolla* pink, '2 in. long, limb of standard hardly as broad as long, emarginate at tip. *Pod* semi-transparent, finely downy, 3-5 in. long, '6 in. across below, '3 in. wide at thickened apex.

To this, owing to its having the same very distinctive calyx, the writer has referred Mr. Kurz's n. 1709 (which formed part of *Butea acuminata* Kurz, *not of* Wall.), although Mr. Kurz's specimen has not any leaves. By the leaves alone this is remarkably distinct from any of the other Indian species of *Spatholobus*. Possibly it may turn out to be the same as *Pongamia rigida* Grah. in Wall. Cat. 5908, which is not at Calcutta; should this prove to be the case the species must be known as *Spatholobus rigidus*.

6. *SPATHOLOBUS MAINGAYI* Prain, *Journ. As. Soc. Beng.* lxi. 2. 79; leaflets thick and rigid, ovate-acute, rounded at the base, glabrous beneath, flowers small, calyx adpressed brown-puberulous, teeth all rounded one-third the length of tube; pod unknown.

MALACCA; *Maingay* 611! PERAK; *Kunstler* 3535! 4652! 6906! 10428! *Scortechini* 206! 1537! *Wray* 1270! SINGAPORE; *Ridley!*

Branches glabrous. *Leaflets* rather like those of *S. acuminatus* but thicker, shorter, quite glabrous, 3 in. long, 1'75 in. wide. *Inflorescence* in terminal and axillary panicles 6-8 in. long. *Pedicels* shorter than calyx, bracts minute persistent. *Calyx* '12 in. long. *Corolla* '25 in. long, standard orbicular very slightly emarginate.

A very distinct species, which has in the field been referred by Father Scortechini to *Derris* § *Aganope* and supposed by that learned botanist to be perhaps Miquel's *Derris macrophylla*. The presence sometimes, though not always, of stipels shows, however, that the plant cannot well be a *Derris* and indicates that it is almost certainly a *Spatholobus*. It is unfortunate that, of all the gatherings reported, not one should be in fruit.

7. *SPATHOLOBUS DUBIUS* Prain, *Journ. As. Soc. Beng.* lxi. 2. 79; leaflets rigid-ovate, acute, rounded at the base, adpressed-puberulous beneath, flowers small, calyx adpressed-pubescent, teeth half as long as tube triangular except the 2-fid upper; pod unknown.

PERAK; on Gunong Bubu, *Kunstler* 7585! PENANG; *Curtis*!

A large climber 100–150 feet long, stem 6–8 in. in diam. *Leaflets* like those of *S. Maingayi* but thinner, adpressed-puberulous beneath, and often larger, 2–6 in. long, 1.5–3 in. wide; the upper leaves are at times 1-foliate as in *S. bracteolatus* and in *S. littoralis* Hassk. *Inflorescence* in terminal and axillary spreading panicles, the former 8 in. the latter 4 in. long, sometimes several in same axil. *Bracts* small persistent. *Calyx* 12 in. long. *Corolla* 25 in. long, pure-white, standard orbicular retuse.

Also a very distinct species, but, like the preceding, in the absence of fruit not absolutely certainly a *Spatholobus*. It appears to be nearest to *S. littoralis* Hassk., from which it differs in having the lip of calyx toothed and in having the leaves uniformly adpressed-puberulous beneath.

8. *SPATHOLOBUS RIDLEYI* Prain, *Journ. As. Soc. Beng.* lxi. 2. 80; leaflets rigid, chartaceous, oblanceolate, apex acuminate, quite glabrous beneath, flowers small, calyx adpressed-pubescent, teeth very unequal, upper truncate the others rounded half as long as tube, pod sessile narrowed to the tip.

SINGAPORE; cult. in Bot. Garden, original locality not given; *Ridley* 6401!

A climber with glabrous, slightly angled branches. *Leaflets* bright-green shining above, 3–3.5 in. long, 1–1.25 in. wide. *Inflorescence* in axillary racemes 3 in. long. *Pedicels* rather larger than calyx. *Calyx* 12 in. *Corolla* 25 in. long, white, standard orbicular, limb slightly auriculate at base, apex retuse. *Pod* 4 in. long, 1 in. across below, 4 in. wide at opaque seed-bearing tip; membranous part sparsely puberulous, reticulate-veined.

A very distinct species, though nearest to *S. macropterus* Miq., from Sumatra.

69. MASTERSIA BENTH.

1. *MASTERSIA ASSAMICA* Benth. in *Trans. Linn. Soc.* xxv. 300 (1865).
M. cleistocarpa Bak. in *Hook. fil. Flor. Brit. Ind.* ii. 195 (1876).

There is only one species; therefore Mr. Benthams name, which is nine years prior to that used in the *F. B. I.*, must stand.

70. CANAVALIA ADANS.

3. *CANAVALIA TURGIDA* Grah. in *Wall. Cat.* 5534; leaflets ovate or oblong acute rarely obtuse, racemes few-flowered, pod few-seeded turgid;

the endocarp separating from the pericarp, woolly. *Miq. Flor. Ind. Bat.* i. 215; *Prain, Bot. Laccad.* 36. *C. ensiformis* var. *turgida* Bak. in *Flor. Brit. Ind.* ii. 196. *Dolichos rotundifolius* Roxb. *Flor. Ind.* iii. 302.—*Rheede Hort. Malab.* viii. t. 43.

LACCADIVES; Minikoi, *Alcock!* SUNDIRBUNS; *Kurz! Clarke! Heinig!* S. INDIA; Cochin, on sandy coasts, *Rheede*; Islands at mouth of Godaveri, *Roxburgh.* BURMA; Arracau, *Kurz!* Pegu, *Prain!* Martaban, *Cleghorn.* ANDAMANS and NICOBARS; common on the coasts. PERAK; *Scortechini! Kunstler!* PENANG; *Wallich!* SINGAPORE; *Hullet!*

A glabrous perennial, climbing on bushes along the coasts. *Leaflets* as in *C. ensiformis*. *Flowers* as in *C. ensiformis* but fewer. *Pod* 5 in. long, 2-2½ in. wide, very turgid.

There is no doubt that this plant is specifically distinct from *C. ensiformis*, with which it has been placed in the *F. B. I.*; the separable endocarp at once amply differentiates it. This, however, is the plant to which the name *C. obtusifolia* properly belongs. For *C. obtusifolia* DC. is *Dolichos obtusifolius* Lamk. and *Dolichos obtusifolius* Lamk. is the plant figured by *Rheede (loc. cit.)*. It is, moreover, *Dolichos rotundifolius* Vahl., of which indeed De Candolle had seen a specimen, thus confirming the conclusion that *Roxburgh* had already formed. This, from his drawing, is without any possibility of doubt *Roxburgh's Dolichos rotundifolius*.

The plant named *C. obtusifolius* in the *F. B. I.* is certainly the plant figured by Dr. *Cleghorn (Madr. Journ. n. s. i. t. 4)* and is in all probability the Chinese plant that *Roxburgh* named *D. obcordatus*. The pods of the two are quite alike and differ totally from those of *C. turgida*. The writer cannot, however, separate this *Madras* and Chinese species from *Dolichos lineatus* Thunbg. (*Canavalia lineata* DC.), either by *Thunberg's* or *De Candolle's* descriptions, by the specimens in *Herb. Calcutta* received from Japan, or by the figure published in the *Somoko Dusets*, ed. ii. xiii. t. 20. In this indeed he only agrees with Mr. *Baker*. The true name of the *C. obtusifolia* of the *F. B. I.* is therefore *C. lineata* DC. In any case the species now being discussed should be put in some particular place; as arranged in the *F. B. I.* it is given, if it comes from India, under *C. obtusifolia* and, if it comes from Malaya, is made a variety of *C. ensiformis*; it cannot well be both.

71. DIOCLEA H. B. K.

1. *DIOCLEA REFLEXA* Hook. fil. Leaves beneath sparsely hairy or glabrescent.

Add to synonyms of *F. B. I.*:—*Dolichos hexandra* Roxb. *Hort. Beng.* 55; and delete the synonyms *D. javanica* and *D. Fergusonii*. Add to localities:—ANDAMANS; very common.

Roxburgh's Dolichos hexandra came from Silhet where *Hooker* and *Thomson* also afterwards found the species; in *Herb. Calcutta* *Roxburgh* has left a beautiful coloured figure of the plant. It is particularly plentiful in the Andamans. The vexillary stamen in both the Indian *Diocleas* is free at the base though not above; is rather shorter than the others and has a perfect anther; the anthers of the 9 stamens united in the keel-sheath are alternately perfect and abortive; there are thus 5 perfect anthers in the sheath and a sixth perfect on the vexillary stamen; hence *Roxburgh's* very excellent specific name.

2. *DIOCLEA JAVANICA* Benth., *Pl. Jungh.* 236; leaflets beneath densely softly velvety, always rather smaller. *D. Fergusonii* Thw. *Enum.* 412.

CHITTAGONG; Kodala Hill, *King's Collector!* CEYLON; *Ferguson!* (*Thwaites*, C. P. 3817) ! MALACCA; *Maingay!* PERAK; common, *Kunstler!* *Wray!*

Leaflets not exceeding 4 in. in length, puberulous above and always densely velvety beneath. *Flowers* and *Pods* as in *D. reflexa*, of which, as Mr. Baker thinks, this may be but a form. The two are, however, so easily recognised that it seems better, from the field-botanist's point of view, to keep them apart.

72. *PUERARIA DC.*

1b. *PUERARIA SIKKIMENSIS* Prain; calyx densely silky, teeth sub-obtuse shorter than the tube, bracts as long as buds, lamina of wings oblique subspathulate.

SIKKIM; Terai, *Anderson!* *Gamble!* *G. Gammie!* Teesta valley, *King!* Rungeet, 1000 feet elev., *Clarke* n. 27263!

Stems wide-twining, young branches rusty-puberulous. *Leaflets* membranous, very broadly rhomboid, acute, terminal 6 in. long by 7 in. wide, glabrous above, very sparsely adpressed-pubescent beneath. *Flowers* in dense clustered racemes and panicles from nodes along the stem, usually only 4–6 in. long, pedicels short densely fascicled, densely rusty-tomentose as are the lanceolate bracts .25 in. long, and the rachis. *Calyx* .3 in. long, densely rusty-tomentose. *Corolla* large, .75 in. long, limb of standard orbicular, auriculate, .5 in. wide. *Pod* unknown.

A very distinct species, nearest to *P. tuberosa*, but very readily distinguished by its rusty instead of grey-silky pubescence, its larger bracts, and its much larger flowers.

2. *PUERARIA CANDOLLEI* Grah.

Add to localities of *F. B. I.*:—ANDAMANS; Coco Group, *Prain!*

4. *PUERARIA WALLICHII* DC. Add to synonyms of *F. B. I.*:—*Dolichos frutescens* Ham. in *Don. Prodr.* 240.

Add to localities:—N.-W. HIMALAYA; Hardwar, *Wallich!*

Dr. Wallich's 5352 C., issued by some extraordinary oversight as *Pueraria tuberosa*, is this species. An original specimen of *Dolichos frutescens*, to which Dr. Hamilton has himself added name and manuscript description, shows that that species is *Pueraria Wallichii*. The writer is of the same opinion regarding *P. composita* Grah. as is Mr. Baker, and cannot follow Mr. Kurz even to the extent of making Graham's Burmese plant a variety of *P. Wallichii*.

6. *PUERARIA THUNBERGIANA* Benth. *Journ. Linn. Soc.* ix. 122. *Pachyrhizus Thunbergianus* Sieb. & Zucc. *Fam. Nat. Fl. Japon.* ii. 113. *Neustanthus chinensis* Benth. *Fl. Hongkong.* 86. *Pueraria Thomsoni* Benth. *Journ. Linn. Soc.* ix. 122; *Bak.* in *Flor. Brit. Ind.* ii. 198. *Dolichos grandifolius* Grah. in *Wall. Cat.* 5556. *D. spicatus* Wall. (*partly*) in *Cat.* 5557.

A careful examination of the now abundant material of this species both from India and from China shows that Mr. Benthams two proposed species are not separable even as varieties. Recently the species has been obtained by Mr. Clarke and by the writer in the Naga Hills of Upper Assam, and by Dr. A. Henry in Hupeh, so that its geographical area is probably continuous from Japan to Sikkim, where it is quite common.

7b. *PUERARIA COLLETTII* Prain; shrubby when young, sometimes climbing when older, pedicels in flower not exceeding the small calyx; pod pubescent 8-10-seeded. *Pueraria* sp. nov. *Coll. & Hemsl., Journ. Linn. Soc.* xxviii. 48.

UPPER BURMA; Shan Hills at Ywagyen, 4000 feet, *Collett* 654! Maymyo, *King's Collectors*! Fort Stedman, Indine, Taungyi, Saga, etc., very common, *King's Collectors*!

Perennial; when shrubby 5-6 feet high, with subterete velvety branches. *Leaflets* thickly membranous, usually densely velvety on both surfaces and not losing their tomentum even when aged; end one ovate-acute, 5-7 in. long, base cuneate from the middle, lateral similar but with oblique base, externally slightly rounded. *Racemes* spicate axillary, canescent, 8-10 in. long; bracts small soft usually falling; pedicels in fruit .25 in. *Calyx* .2 in., velvety. *Corolla* .4 in., purplish. *Pod* linear, flat, pale, 2 in. long, .25 in. wide, very uniformly 10-seeded, occasionally 1 or 2 abortive.

This is extremely near *P. stricta* Kurz, but differs in having longer axillary racemes with soft hardly persistent bracts; in having pubescent pods with thicker valves and in having densely pubescent, indeed almost velvety leaves, the pubescence persisting even when the plant is in ripe fruit. Sir H. Collett and Mr. Hemsley had already decided that this was probably an undescribed species, but in the absence of fruit were unable to provide a diagnosis. It is therefore named in honour of Sir Henry, who first collected it.

Sir Henry found it an erect shrub, as have all our native collectors save one, who notes that at Maymyo it was climbing. It is very strange that although this species has now been found so plentifully, none of our Calcutta collectors have again met with *P. stricta*, *P. hirsuta* or *P. brachycarpa*, three species described in this *Journal* (vol. xlii) by the late Mr. Kurz, and all of them described from rather inadequate material; none of the three are in flower and of none were there duplicate specimens for distribution, so that Mr. Baker when dealing with the genus in the *Flora of British India* had seen no specimens. That *P. hirsuta* is very distinct is certain; its leaflets have 8-10 pairs of lateral nerves that are of equal strength. Otherwise its general appearance is exactly that of the other three species, all of which have primarily sub-3-nerved leaflets, owing to the lowest pair of lateral nerves being stronger than the others. *P. brachycarpa* indeed looks as if it might only be a short-podded variety of *P. stricta*, and it is within the bounds of possibility that when their flowers are known it may be necessary to reduce the one to the other and to unite *P. Collettii* with the two.

10. *PUERARIA PHASEOLOIDES* Benth.

The synonym usually quoted as *Phaseolus decurrens* is an error for *P. decurvus*, the latter being what Graham and Wallich actually wrote.

10b. *PUERARIA SUBSPICATA* Benth, *Journ. Linn. Soc.* ix. 125; Kurz

in *Journ. As. Soc. Beng.* xlv. 2:253. *Dolichos ficifolius* Grah. in *Wall. Cat.* 5563. *Dolichos spicatus* Wall. *Cat.* 5557 A. B. (not C).

NORTH BENGAL; at Dingra Ghat, *Kurz!* E. BENGAL; Mymensingh, *Clarke* n. 7980! SIKKIM; at Selim, 1000 feet, *Clarke* 36867! BOOTAN; *Parkes!* DUARS; Mahakulgiri, *Heawood!* SILHET; *Wallich* 5557 A! *Clarke* 18502! 14341! ASSAM; *Masters!* *Simons!* KHASIA; *Clarke* 44995! NAGA HILLS; *Clarke* 40819! CHITTAGONG; very common, *King's Collectors!* BURMA; Pegu, *Wallich* 5563! *R. Scott!* Arracan; *Kurz!* TENASSERIM; *Helper!* *Gallatly!*

It is impossible to assent to the reduction of this species to *P. phaseoloides*; the leaves are almost always more deeply lobed, the flowers are always very much larger—the calyx being .35, the corolla .8–1 in. long.; the pods are usually longer, are always broader and have the sutures, especially the dorsal, slightly thickened. There are moreover no intermediates to be found among the specimens in *Herb. Calcutta*, which include representatives of 20 gatherings of *P. phaseoloides* and 27 gatherings of *P. subspicata*.

73. PHASEOLUS LINN.

The species of *Phaseolus* cultivated and wild in India, stand much in need of careful revision and comparison with the types of the species originally named by Linnæus. This remark applies with especial force to the species and forms of the section *Strophostyles*. Many very competent botanists have dealt with the subject in the light of Herbarium material in Europe; the only author who ever really knew the plants themselves was unable to collate his knowledge with the early references. And till another author who knows the plants themselves as Dr. Roxburgh knew them shall be able to deal with the subject, it is impossible to hope for a disentanglement of their very vexed synonymy or indeed to decide their exact specific limitation.

3. PHASEOLUS ADENANTHUS *G. F. Mey.*

Add to localities of *F. B. I.*:—ANDAMANS; sea-coasts, *King's Collectors!* Narcondam, *Prain!*

4. PHASEOLUS TENUICAULIS *Bak.*

The specimen of *P. sublobatus* var. *tenuicaulis* Grah.—the basis of this species,—is at Calcutta indistinguishable from *Dolichos falcatus* Klein.

8. PHASEOLUS ACONITIFOLIUS *Jacq.*

In the *Index Kewensis* it is stated that Roxburgh's *P. aconitifolius* of the *Hortus Bengalensis* and of the *Flora Indica* is not this species but is *P. trilobus*.

This is not what is said either by Wight and Arnott or by Baker; these authors are right. The *Index Kewensis* citation is perhaps based on the fact that on a figure of *P. trilobus* sent to the E. I. C. Museum, Roxburgh wrote "*P. aconitifolius*" by a *lapsus calami*. This has been mentioned by Wight and Arnott; but both in his *Hortus Bengalensis* and in his *Flora Indica*, Roxburgh indicated by the name *P. aconitifolius* the plant known in India as the *Moth*, which is undoubtedly *P. aconitifolius* Jacq.

10. PHASEOLUS PAUCIFLORUS *Dalz.*

Add to localities of *F. B. I.*:—RAJPUTANA; Mt. Abu, *King!*

This does not appear to the writer to differ specifically from *P. calcaratus*, though it seems a fairly distinct variety.

11. PHASEOLUS RADIATUS Linn. Sp. Pl. 725.

The writer quite agrees with Mr. Baker in considering that *P. Max* Roxb.—the *Krishna Mung*, and *P. aureus* Roxb.—the *Sona Mung*, are only varieties of *P. Mungo* Roxb.—the *Mung* itself. But the *Másh* or *Urd*, which is a totally different plant, yielding an entirely distinct crop, hardly deserves to be treated as specifically identical with *Mung*. The two plants perhaps differ as species of subordinate rank only, and from the monographer's point of view may be sufficiently differentiated if treated as subspecies. But in a *Flora* no good purpose is served by introducing academic refinements of this kind into the discussion, and it is better to treat the two plants apart from each other, as Indian cultivators and Government officers, from the necessities of the case, are compelled to treat them.

The unfortunate thing is that the name which Linnæus gave to *Mung*, as is shown by his diagnosis and his reference to Dillenius' excellent figure in *Hort. Eltham*. t. 235, f. 304, does not conserve the vernacular name of the plant. This would not, of course, have mattered very greatly had Linnæus not at a later date used the word *Mungo*, as his description of the plant shows, to designate NOT *Mung*, but *Tikari*. Roxburgh endeavoured to set matters right by reversing the names;—Roxburgh's *P. Mungo* is *Mung*; his *P. radiatus* is *Másh*. In Mr. Baker's account of the plants Roxburgh's treatment is followed, for the *P. Mungo* of the *Flora of British India* is *Mung* and is Roxburgh's *P. Mungo*, but not *P. Mungo* Linn.; Mr. Baker's *P. Mungo* VAR. *radiata* is Roxburgh's *P. radiatus*, but most certainly is not *P. radiatus* Linn., for it is not the plant figured by Dillenius.

The variety *glabra* of the *F. B. I.* (which is *P. glaber* Roxb., a plant introduced to the Calcutta garden from Mauritius) is a variety of *P. calcaratus*. The variety *Wightiana* is not a form of *Mung* but of *Másh*, as its short ascending pods show. And the writer thinks it possible that in *P. trinervius* of the *F. B. I.* (an older name for which is *P. sublobatus* Roxb.) we have the wild form from which perhaps both *Mung* and *Másh* have originated. All three, however, deserve, he believes, to be considered equally distinct now.

The three leading varieties of *Mung* (*P. radiatus* Linn.) may be readily distinguished as follows:—

1. VAR. *typica*; foliage dark-green, pods spreading, seeds green. *P. radiatus* Linn. Sp. Pl. 725. *P. Mungo* Roxb. *Flor. Ind.* iii. 292. *P. Mungo* also of the majority of Indian plant-lists; the *Mung* or *Chey*t *Mung* crop; certainly not *P. Mungo* Linn.
2. VAR. *aurea*; foliage paler, pods reflexed, seeds yellow. *P. aureus* Roxb. *Flor. Ind.* iii. 297. *P. Atsuki* Sieb. *Verh. Batav. Gen.* xii. 57. *Sona Mung*, the most esteemed form of *Mung*, generally believed by the natives not to be a 'deshi,' or native variety.
3. VAR. *grandis*; foliage medium-green, pods longer, spreading, seeds black. *P. Max* Roxb. *Flor. Ind.* iii. 295 *viz* Linn.; *Krishna Mung*, the least esteemed form of *Mung*. This is certainly an introduced form, probably from the Chinese Empire where it is widely grown from Shanghai to Yarkand. In S. China it is called *Luton*, "green-beans" (*A. Henry* n. 68); in Yarkand Dr. Scully notes that *this* is what is known as *Másh*, a name that in India is restricted to *P. radiatus* Roxb. (*P. Mungo* Linn.)—the *Másh-Kulai* or *Urd* crop.

P. Max Linn. is a composite species. Wight and Arnott say that the plant from Hermann's herbarium included here, and on which the species was probably based,

has no flowers. The American plant quoted by Linnæus under *P. Max* is, according to Savi, a distinct species *P. Hernandezii*; the *Cadelium* of Rumphius (*Herb. Amboin.* v. t. 140) also quoted, is obviously a form of *Glycine hispida* Maxim., the *Soy* or *Soja*.

11b. PHASEOLUS MUNGO Linn.

Of this there are two fairly distinct forms:—

1. *Vera*; stems hirsute, scandent or subscandent, seeds black. *P. Mungo* Linn. *Mantiss.* 101. *P. Wightii* W. & A. *Prodr.* 245; *Herb. Ind. Or. H. f. & T.* *P. Wightianus* Grah. Wall. *Cat.* 5591. The *Tikari*; perhaps hardly varietally distinct from the next.

2. *Roxburghii*; stems hirsute, diffusely spread but not scandent, seeds grey. *P. radiatus* Roxb. *Flor. Ind.* iii. 296 not of Linn. *P. Roxburghii* W. & A. *Prodr.* 246. "Udidi" Rheede *Hort. Malab.* viii. 50. The *Urd* or *Másh-Kulai*; a very important Indian crop, totally different from, and much more important than, the *Múng* crop.

Phaseolus subvolubilis Ham. in Wall. *Cat.* 5605, referred in the *F. B. I.* to the first form, is at Calcutta *P. calcaratus* Roxb. *P. setulosus* Dalz., referred in the *F. B. I.* to the second, has pods and seeds like those of *P. trinervius*, of which the writer treats it as a variety.

12. PHASEOLUS SUBLOBATUS Roxb. *Hort. Beng.* 54; *Flor. Ind.* iii. 288.

In a monograph of the genus *Phaseolus* the writer would feel inclined to reduce this (but as a sub-species, not as a mere variety) to *P. Mungo* in the wide sense which would make *P. Mungo* include both the *Múng* and the *Másh-Kulai* under one name. In this plant we probably see the wild stock whence both cultivated plants were originally derived. Here there are three fairly distinct forms, though the two first are very close to each other and can only be separated by the colour of their tomentum; their pods and seeds are identical, as are their flowers. In the *Flora of British India* the two are referred to different species.

1. VAR. *typica*; flowers small, tomentum on stems and pods reddish. *P. sublobatus* Roxb. *P. trinervius* Heyne in Wall. *Cat.* 5603; *Bak.* in *Flor. Brit. Ind.* ii. 203. *Vigna brachycarpa* Kurz, *Journ. As. Soc. Beng.* xliii. pt. 2, 185.

Behar westward to the Concan; thence south to Ceylon: Arracan.

2. VAR. *setulosa*; flowers small, tomentum on stems and pods grey. *P. setulosus* Dalz. in *Kew. Journ.* ii. 33.

Concan and Western Deccan only.

3. VAR. *grandiflora*; flowers large, tomentum on stems and pods reddish. *P. trinervius* Kurz, *Journ. As. Soc. Beng.* xlv. pt. 2. 249 hardly of Heyne. This may prove to be more than varietally distinct, the septa between the seeds being decidedly narrower than in the two preceding varieties.

BURMA; Pegu, Kurz, 1725! Martaban, Falconer 620! *DISTRIB.* Sumatra, Java.

Dr. Roxburgh's name for this species has been omitted from the *Flora of British India*; regarding the plant Roxburgh intends, which is the *Gora-múng*, dispute is impossible, both on account of the native name and from Roxburgh's figure. In the *Index Kewensis* Roxburgh's *P. sublobatus* is given as = *P. trilobus*, an impossible identification for which the writer has failed to trace any bibliographic authority.

12b. PHASEOLUS RICCIARDIANUS Ten. *Ind. Sem. Hort. Neap.* (1833) 4; stems flexuose clothed with fine deciduous spreading hairs, stipules large lanceolate, leaflets entire or faintly lobed, racemes usually branched,

bracteoles linear, flowers rather large, pods glabrous. *Savi Mem. Ac. Torin.* xxxviii. 173 t. 3.

VAR. *macrocarpa*; pod large, flat.

NAGA HILLS; Kohima, *Watt.* n. 7343! CHITTAGONG; Kodala, *King's Collector.*

Leaflets narrowly ovate-lanceolate, 3-4 in. long by 1.5-2.5 in. wide; stipules .4 in. long, fixed a little below middle. *Flowers* yellow, .65 in. long, lower pedicels twice as long as calyx, bracteoles shorter than calyx. *Pods* 5 in. long, .4 in. broad, distinctly compressed, 8-10-seeded, seeds brown .25 in. long, .2 in. across, with prominent white hilum set on one side towards lower end of seed.

It is with some dubiety that this *Phaseolus* is here referred to *P. Ricciardianus*. The stems, leaves and flowers agree well with those figured by Savi, and still better with those of Japanese specimens named *P. Ricciardianus* by Mr. Maxiowicz. But Savi (*loc. cit.*) describes the pod as terete and has figured a pod that is much smaller than the one in this plant. Not impossibly this Naga and Lushai vegetable may yet prove to be a distinct species.

13. PHASEOLUS CALCARATUS Roxb.

Very commonly cultivated and very variable. Besides the typical form, the following varieties may be noted:—

a. VAR. *major*; foliage and tomentum as in type but flowers much larger. *P. hirtus* *Wall. Cat.* 5593 *not of Retz.*

KHASIA; Nunklow, *Clarke* n. 44819! NAGA HILLS; Jotsoma *Prain!* BURMA; cult. on the Salween, *Wallich!* Shan Hills, *King's Collector!*

This only differs from ordinary *P. calcaratus* by its larger flowers, and may be no more than a form of the type.

b. VAR. *glabra*; foliage and habit of VAR. *major* and of the type but leaves and stems almost glabrous; flowers as in VAR. *major*. *P. glaber* *Roxb. Hort. Beng.* 55.

PANJAB; at Pathankote, *Clarke* 21964! SIKKIM and BOOTAN; not uncommon. SILHET; *Gomez* (*Wall. Cat.* 5549 G. and 5589 H.) KHASIA; *Clarke* 14684! *G. Mann* 38!

Roxburgh describes the plant as not twining in the Calcutta garden; it does, however, twine when it has opportunity. The gatherings quoted will be found to agree extremely well with the plant Roxburgh depicts. In any case his *P. glaber* can by no possibility be a form of *P. Mungo* even in the widest sense; its pods are glabrous and, as if this were not sufficient, its seeds, as delineated by him, have not the hilum of *Mung* or of *Másh-kalai*, but have the very different hilum and are quite the shape of those of the *Sutri* which is *P. calcaratus*; indeed, VAR. *glabra* is even less easily separable from typical *P. calcaratus* than is VAR. *major*. *Wall. Cat.* 5549 G., at Calcutta (which ought to be *Vigna Catjang* Endl.) is this same plant!

c. VAR. *Rumbaiya*; stems short erect or diffuse. *Phaseolus* n. 40, *Herb. Ind. Or. H. f. & T.* *P. Clarkeanus* *Brace MSS.* in *Herb. Calcutta.*

KHASIA HILLS.

P. torosus *Roxb. Flor. Ind.* in. 298 only differs from this in having

Pods torulose when ripe, and is probably but another form of the variety. Roxburgh received it through Buchanan-Hamilton from Nepal.

This is the very puzzling crop, sometimes called *Khasia Múng*, but known to the Khasias themselves as *Rumbaija*. It is certainly not a form of *P. radiatus*—the true *Múng*, still less is it a form of *P. Mungo*—the *Urd*. It does not, however, in the writer's opinion deserve to be considered a distinct species, the flowers and fruits are so exactly those of typical climbing *P. calcaratus*.

d. VAR. *gracilis* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 50; stems very slender twining, quite glabrous as are the leaves; leaflets usually narrower than in VAR. *typica*; flowers and pods as in the type.

MALAY PENINSULA; Perak, very common in open grassy places, *Kunstler* 990! 1035! 2467! *Wray* 1756! *Scortechini* 1476! Pahang, *Ridley* 1124! DISTRIB. Sumatra (*Forbes*!)

Phaseolus subvolubilis Ham. in *Wall. Cat.* 5605, referred at Kew by Mr. Baker to *P. Mungo* happens in Herb. Calcutta to be *P. calcaratus*.

14. PHASEOLUS FUSCUS *Wall.*

This has a naked style with a capitate stigma, and therefore not only is not a *Phaseolus*, but does not even belong to the subtribe *Euphaseoleæ*.

15. PHASEOLUS VELUTINUS *Grah.*

This species, placed in the same section as the preceding, has no better right to be included in the genus *Phaseolus*; quite as certainly it is not at all nearly related to *P. fuscus*; both are members of the tribe *Phaseoleæ*; there all comparison between them ends. The nearest ally of *P. velutinus* is *Vigna lucens*, Bak., from which it is hardly distinguishable by foliage, by fruit, or by inflorescence, and is only to be separated by its larger flowers. Mr. Kurz has already pointed out that the two are unmistakeably congeneric; he has, however, proposed to treat them as *Canavalias*. They do, as to pods, a good deal resemble *Canavalia*, but their stigmas being bearded differ so greatly that it is inconvenient to adopt Mr. Kurz's proposal, and a preferable course is to treat this as the type of a distinct genus which will include *Vigna lucens* as well.

73.* DYSOLOBIUM PRAIN.

(*Phaseolus* § *Dysolobium* Benth. Pl. Jungh. 239, footnote.)

Twining, usually woody, with 3-foliolate stipellate leaves. *Flowers* in copious axillary racemes, bracteoles inconspicuous deciduous. *Calyx* campanulate, the lower tooth lanceolate longer than the rest, but shorter than the tube, the two uppermost connate. *Corolla* much exserted, keel beaked and sometimes distinctly curved and laterally deflexed. *Stamens* diadelphous; anthers uniform. *Ovary* sessile many-ovuled, style filiform bearded below the oblique stigma. *Pod* thick woody subterete oblong villous, very markedly septate, with double septa between the velvety seeds. Species 4; Indian.

This genus is made to comprise four undoubtedly congeneric forms, three of which constitute the group *Dysolobium* founded by Bentham in 1851 (*Pl. Jungh.* 239)

as a section of *Phaseolus*. In the *Genera Plantarum* (i. 539) Bentham and Hooker, while still recognising the group, doubt whether it constitutes a section of *Phaseolus*, and suggest that it may be found preferable to refer it to *Vigna*. The natural character of the group is, however, somewhat marred in the *Genera Plantarum* by the inclusion of a species figured by Wallich as a *Phaseolus* (*Pl. As. Rar.* i. 6, t. 6) which Kurz has clearly shown to be a *Dunbaria* (*Journ. As. Soc. Beng.* xliii. 2, 186; xlv. 2. 255). Kurz, who treated the group in the sense originally understood by Bentham, recognised quite clearly that it can by no possibility be included in *Phaseolus*; he has consequently adopted a suggestion made in a MSS. note that Wallich has left in Herb. Calcutta, and referred all the *Dysolobia* to *Canavalia*. For this, at first sight, there is something to be said; the structure of the pod in all the species is very much that of *Canavalia*. When, however, it is considered that the calyx differs altogether from the calyx of *Canavalia*, that the style is bearded, and that the seeds are hirsute, it seems less convenient to adopt Wallich's suggestions than to adopt Bentham's. Baker has attempted a compromise; in the *Flora of British India* he still treats *Dysolobium* as a section of *Phaseolus*; he leaves in it, however, only two forms, viz.:—the species of the group that has the longest beak to its keel, and the *Dunbaria* that has, by inadvertence, been cited as a *Dysolobium* in the *Genera Plantarum*; the other two he has referred to *Vigna*. The last species of the group he has, in the absence of flowers, dealt with tentatively as a *Psophocarpus*. Taubert (in Engler's *Natürlichen Pflanzenfam.* iii. 3, 380) has thrown no new light on the affinities of the group; on the contrary he has accorded it, without qualification of any kind, the treatment and the position regarding which the authors of the *Genera Plantarum* have so expressly enjoined caution.

That the group as originally recognised by Bentham forms, in consequence of its firm, septate pods and its hirsute seeds one of the most natural and definite genera in the whole of the *Phaseolidæ* does not, the writer thinks, admit of question; to settle the dubiety that has prevailed as regards its proper position, it seems to the writer most convenient to adopt Mr. Bentham's name in a generic sense and to treat the forms it covers as a group apart alike from *Canavalia*, *Phaseolus* and *Vigna*.

Key to the Species.

Racemes lax long-peduncled, flowers large; pods closely velvety-villous, seeds sparsely velvety; (pods keeled along suture but not winged):—

Leaflets rounded cuspidate, chartaceous, hirsute on nerves beneath; flowers 1·75 in. long, keel with long laterally deflexed beak, style bearded down the face ...

1. *D. grande*.

Leaflets narrowed to a point, membranous, glabrescent; flowers only ·6 in., long, beak of keel not deflexed, style penicillate round stigma ...

2. *D. lucens*.

Racemes dense short-peduncled; flowers small (·3 in. long or less); pods softly hirsute with long hairs, seeds densely velvety; (beak of keel not deflexed):—

Leaflets roundish cuspidate; pod neither keeled nor winged ...

3. *D. dolichoides*.

Leaflets lanceolate; pod subquadrangular, prominently winged along the angles ...

4. *D. tetragonum*.

1. *DYSOLOBIUM GRANDE* Prain. *Phaseolus grandis* Ham. in Wall. Cat. 5602; Bth. in Pl. Jungh. i. 239 footnote; not *P. grandis* Dalz. *P. velutinus* Grah. in Wall. Cat. 5615; Bak. in Flor. Brit. Ind. ii. 204. *Canavalia grandis* [Wall. MSS. in Herb. Calcutta]; Kurz. in Journ. As. Soc. Beng. xliii. 2. 185 and xlv. 2. 252.

NORTH BENGAL; Kurz! SIKKIM; T. Anderson! KHASIA; at Nungpo, Clarke n. 40703! G. Mann! ASSAM; at Goalpara, Hamilton (Wall. Cat. 5602)! Jenkins! Masters! BURMA; Taong Doung Mts., Wallich (Cat. 5615 A)! Shan Hills, at Fort Stedman, Saga, etc., common, King's Collectors! DISTRIB. Yunnan (J. Anderson!)

This species has a very long, deflexed beak to the keel of the corolla, hooked round so as almost to complete a spiral; in this respect it resembles, to a considerable extent, a *Phaseolus*; its pods and seeds are however totally unlike those of any *Phaseolus*. Nothing requires to be added to Mr. Baker's excellent description.

In reducing this species to *Canavalia* Mr. Kurz has omitted to state that he was only following the treatment already proposed by Dr. Wallich in a manuscript note dated "25th October 1833."

2. *DYSOLOBIUM LUCENS* Prain. *Phaseolus lucens* Wall. Cat. 5601; Benth. in Pl. Jungh. 239 footnote. *Canavalia lucens* Kurz. Journ. As. Soc. Beng. xliii. 2. 185 and xlv. 2. 252. *Vigna lucens* Bak. in Flor. Brit. Ind. ii. 207. *Phaseolus grandis* Herb. Ind. Or. vix Wall.

CHITTAGONG; Hooker and Thomson! PEGU; Kurz n. 2550! RANGOON Cleghorn! TAVOY; Gomez (Wall. Cat. 5601)!

So remarkably like the preceding that without flowers it is difficult to distinguish the two species. The flowers are, however, very unlike; in the present plant they are less than half the size and have a much shorter beak to the keel than in *D. grande*. Again nothing can be added to Mr. Baker's clear description.

3. *DYSOLOBIUM DOLICHOIDES* Prain. *Phaseolus dolichoides* Roxb. Hort. Beng. 54; Fl. Ind. iii. 290; Wall. Cat. 5600; Benth. in Pl. Jungh. 239. *Mucuna recta* Wall. Cat. 5625. *Dolichos dasycarpus* Miq. Flor. Ind. Bat. i. 186. *Canavalia dolichoides* Kurz in Journ. As. Soc. Beng. xliii. 2, 185. *Vigna dolichoides* Bak. in Flor. Brit. Ind. ii. 207.

SILHET; Wallich (Cat. n. 5600 A)! Hooker and Thomson! ASSAM; Jenkins! Masters! Simons! CHITTAGONG; Clarke n. 8312! ARRACAN; Kolodyne valley, Kurz!

This, with the next species, makes a very distinct section of the genus *Dysolobium*.

4. *DYSOLOBIUM TETRAGONUM* Prain; stems woody, brown-pubescent, leaves subcoriaceous entire lanceolate prominently veined; with copious adpressed bristly hairs, racemes many-fld. sub-sessile or shortly peduncled, corolla middle-sized, pod stout short straight square, the angles winged, the faces densely clothed with persistent firm short spreading greyish-brown hairs. *Psophocarpus* sp., Bak. in Flor. Brit.

Ind. ii. 212. *Canavalia tetragona* Kurz MSS. (on specns.); *Vigna tetragona* Kurz MSS. (on covers) in *Herb. Calcutta*.

NORTH BENGAL; Alipur Duars, *Heawood*! ASSAM; *Masters*; *G. Mann*!

Stem wide-twining, densely clothed with persistent pale-brown pubescence. *Stipules* lanceolate minute; leaflets entire 4-6 in. long, .75-1 in. wide, bristly-hirsute on both surfaces. *Racemes* 2-3 in. long, sometimes nearly sessile; pedicels shorter than the calyx, bracteoles minute lanceolate. *Calyx* .1 in., clothed with adpressed hairs; teeth deltoid, lowest lanceolate. *Corolla* blue (*Heawood*), 3-4 times the calyx. *Pod* 2-2.5 in. long, .5 in. wide, firm, septate; the angles distinctly winged as in *Psophocarpus*.

Very nearly related to *D. dolichoides*, but amply distinct by its narrow leaflets and its *Psophocarpus*-like pods. Mr. Kurz apparently refrained from publishing this species because, like Mr. Baker, he only knew the plant in fruit. Excellent flowering specimens with full MSS. notes of the plant have recently been supplied by Mr. Heawood from the Alipur Duars, so that a description can now be given. In foliage and habit this greatly resembles *Vigna Clarkei*, but in that species the hairs on petioles and stems are reflexed, the flowers are yellow, and the pod is almost exactly like that of *Vigna pilosa*.

74. VIGNA SAVI.

2. VIGNA LUTEA A. Gray.

Add to localities of *F. B. I.*:—CEYLON; *Thwaites*! LACCADIVES; *Alcock*!

It is pointed out in the *Index Kewensis* that the oldest name for this, as a *Vigna*, is *V. retusa* Walp. Rep. i. 778, and the name *V. lutea* has accordingly been there changed to *V. retusa*. There seems no object in making this reduction, firstly because *V. retusa* Walp. is only partially equivalent to *V. lutea* A. Gray, since Walpers distinguished in the same work a *V. anomala* which is part of this species; and secondly because Gray's name is now much better known than Walper's one. The name *V. lutea* has the further advantage of conserving the oldest specific epithet, since this is *Dolichos luteus* of Swartz (*Prodr.* 105) and of De Candolle (*Prodr.* ii. 398). Dr. O. Kuntze reduces this to the next species, and the two are certainly almost identical as regards flowers, fruits and seeds; their leaves are however very different, and the differences appear to be constant.

3. VIGNA LUTEOLA Benth.

Here again the *Index Kewensis* proposes that the oldest name for this as a *Vigna*, (*V. glabra* Savi), should replace the better known name *V. luteola*. The objections to the proposed change are parallel to those given under the preceding species. *V. glabra* is only part of *V. luteola*, for Savi recognised another species *V. villosa* that is also referable to *V. luteola*, while again Benth's name conserves the oldest specific epithet, since this is *Dolichos luteolus* Jacq. (*Hort. Vindob.* i. 39 t. 90).

In the event of the adoption of Dr. Kuntze's view that *V. lutea* is after all only a form of *V. luteola*, his name for the two (*Vigna repens*) will have to be considered, since it is clear, as Kuntze says, that this is, perhaps both are, covered by the name *Dolichos repens* Linn. But this is apparently not the *Phaseolus repens* Grah. which Mr. Baker has renamed *Vigna repens*; of the last mentioned plant the writer has not seen specimens.

5. *VIGNA VEXILLATA Benth.*

To the synonyms of this species should apparently be added *Dolichos umbellatus* Thunb. *Trans. Linn. Soc.* ii. 339; at all events the Japanese species identified by M. Maximowicz and other authorities on the botany of Japan with *D. umbellatus* is identical with this. The *Index Kewensis* points out that the oldest name for this as a *Vigna* is *V. capensis* Walp. (*Linnaea* xiii. 533), but it seems a pity to replace the familiar name *V. vexillata*, (which moreover retains the oldest specific epithet, since this is *Phaseolus vexillatus* Linn.), by one so unfamiliar and so inappropriate as the name *V. capensis*.

6. *VIGNA BRACHYCARPA Kurz.*

Of this there is but one specimen in Herb. Calcutta; it is in ripe fruit, and all that is known of its flowers is from Mr. Kurz's field-note that they were small and were yellow. The fruits and leaves, however, amply suffice to show that the plant is only a form of *Phaseolus sublobatus* Roxb. (*P. trinervius* Heyne).

8. *VIGNA DOLICHOIDES Bak.*

This species is not a *Vigna*. It is certainly congeneric with *Vigna lucens* Bak., but it is at the same time equally certainly congeneric with *Phaseolus velutinus* Grah., and the writer has proposed to raise Mr. Bentham and Sir J. Hooker's section *Dysolobium* to the rank of a genus in order to accommodate these three species and another obviously congeneric one that Mr. Kurz has in MSS. named *Vigna tetragona*, but that Mr. Baker has tentatively placed in *Psophocarpus*.

9. *VIGNA PILOSA Bak.*

Add to localities of *F. B. I.*:—ANDAMANS; very common, *King's Collectors*!

9b. *VIGNA CLARKEI Prain*; stems slender, finely pubescent with reflexed hairs, leaflets membranous narrowly lanceolate, entire, with a few adpressed hairs on both surfaces, racemes few-fl'd. peduncled, corolla small, pod slender dotted, with dense adpressed rusty-pubescent.

FOOT OF EASTERN HIMALAYA; Dalkajhar in the Sikkim Terai, *Clarke* n. 37032! Mahakalguri in the Alipur Duars, *Heawood*, 74! 124!

Branches slender but firm, densely reflexed-pubescent as are petioles and peduncles. *Stipules* minute lanceolate, leaflets 4 in. long, under 5 in. wide. *Racemes* 5 in. or less, on peduncles 1-3 in. long; pedicels sparsely reflexed-pubescent 1 in. long, bracts and bracteoles minute. *Calyx* 25 in., teeth pubescent triangular as long as tube. *Corolla* 4 in., yellow. *Pod* 3 in. long, 2 in. in diam., subcylindric, densely adpressed-pubescent, 6-8-seeded.

A very distinct species with ripe pods much like those of *V. pilosa*, but with adpressed instead of spreading hairs.

77. *DOLICHOS LINN.*

SUBGEN. I. LABLAB.

1. *DOLICHOS LABLAB Linn.*

It would be better to follow Roxburgh and Wight, who were thoroughly acquainted with the two plants cultivated in India that are united under this name

in the *F. B. I.*; even if the two are not to be treated as distinct species, they are, in any case, quite deserving of varietal rank. They may be distinguished as follows:—

1. *DOLICHOS LABLAB* Linn.; pods longer, more tapering at point, seeds with long axis parallel to sutures. *D. Lablab* Linn. *Sp. Pl.* 725. *D. lignosus* Roxb. *Flor. Ind.* iii. 305 not of Linn. *Lablab vulgaris* Savi *Diss.* 19; *DC. Prodr.* ii. 401; *W. & A. Prodr.* 250; *Miq. Flor. Ind. Bat.* i. 189. *D. cultratus* Forsk. *Flor. Aegypt.-Arab.* 134.

2. *DOLICHOS LIGNOSUS* Linn.; pods shorter more abruptly truncated at end, seeds with long axis at right angles to sutures. *D. lignosus* Linn. *Sp. Pl.* 726. *D. Lablab* Roxb. *Flor. Ind.* iii. 307 not of Linn. *D. cultratus* Thunb. *Trans. Linn. Soc.* ii. 320 not of Forsk. *Lablab cultratus* DC. *Prodr.* ii. 402; *W. & A. Prodr.* 251; *Miq. Flor. Ind. Bat.* i. 190. *L. microcarpus* DC. *Prodr.* ii. 402; *Miq. Flor. Ind. Bat.* i. 190.

Here, as in the case of *Phaseolus Mungo* and *P. radiatus*, Roxburgh has reversed the incidence of the Linnean names, no doubt because of the fact of that the epithet "*lignosus*" is so much more appropriate when applied to "*Lablab*" than when given to the plant to which Linnæus assigned it. That *D. lignosus* Roxb. cannot be *D. lignosus* Linn., both Wight and Walker-Arnott in their *Prodromus*, and Miquel in his *Flora* of the Dutch-Indies have already pointed out. But Wight and Arnott have considered that Linnæus and Roxburgh had the same plant in view when describing *D. Lablab*. This is hardly possible; Roxburgh identifies with his "*Lablab*" the plant figured by Rumphius in *Herb. Amboin.* v. t. 136, an identification that is obviously just; Linnæus gives this very figure as one of the types of his *D. lignosus*.

6. *DOLICHOS FALCATUS* Klein.

Add to synonyms of *F. B. I.*:—*Phaseolus tenuicaulis* Kurz in *Journ. As. Soc. Beng.* xlv. pt. 2. 249, perhaps not of Bak. in *Flor. Brit. Ind.* ii. 201. *Dolichos tenuicaulis* Grah. in *Wall. Cat.* 5598 D. (at Calcutta).

Mr. Baker's *Phaseolus tenuicaulis* is based on *Wall. Cat.* 5598 D. Excellent specimens, exactly agreeing with the Calcutta example of this sheet, were obtained by Dr. J. Anderson in Upper Burma, and Mr. Kurz, with these before him, has inadvertently published this name without noting that the plant is simply *Dolichos falcatus*. As Mr. Baker finds that the examples of *Wall. Cat.* 5598 D. which he has examined represent a *Phaseolus*, it must follow that Dr. Wallich mixed two plants under this letter. But from Mr. Baker's description the *Phaseolus* in question very closely resembles this *Dolichos*, and no one except Dr. Wallich has collected that *Phaseolus* in Burma or elsewhere.

7. *DOLICHOS SUBCARNOSUS* W. & A.

Exactly agreeing with this in fruit but with shorter and branching peduncles, is a plant common in Assam, Chittagong and Burma which has flowers like those of *Vigna Catjang* except in having the style penicillate round the stigma instead of bearded down the neck. The leaves, however, are just as described by Mr. Baker and are not like those of *Vigna Catjang*.

The following numbered sheets may be quoted, and will indicate the difficulty that has been experienced in localising the species.

GARO HILLS; at Dalamgiri, *Clarke* n. 43117 (issued as *Vigna Catjang*)! CHITTAGONG; at Burundcherry, *Clarke* n. 19508! PEGU; Tongkyeghat, *Kurz* 1730; this forms.

part of Kurz's *Vigna sinensis* (Journ. As. Soc. Beng. xlv. pt. 2. 248), part of his *Phaseolus adenanthus* (loc. cit. 249), part of his *Lablab vulgaris* (loc. cit. 250) and, along with Kurz n. 2545, some part of Mr. Kurz's *Canavalia lucens*.

The pods are not like those of any other Indian *Dolichos* but recall those of a *Clitoria* or an *Apios*.

Considering how unsatisfactorily, even in the most authoritative works on the order, the various genera of *Phaseolidæ* have been limited, the writer prefers at present to leave the species, as Mr. Baker has left it, in *Dolichos*.

70. ATYLOSIA W. & A.

SUBGEN. 1. ATYLIA Bth.

1. ATYLOSIA CANDOLLEI W. & A.

Atylosia major W. & A., reduced by Mr. Baker to *A. Candollei*, is a very distinct plant and is quite deserving of at least the rank of a variety.

2. ATYLOSIA GEMINIFLORA Dalz.

This plant was unfortunately unknown to Mr. Baker; an examination of Dalzell's type specimens shows that the plant is not an *Atylia* at all, but that it is simply Mr. Bentham's *A. platycarpa*, a species of § *Rhynchosioides*, which section, by the way, the *F. B. I.* does not recognise. This section *Rhynchosioides* is, however, an extremely natural one; it includes the two species *A. elongata* and *A. platycarpa*. These species in the *Flora of British India* are separated by a wide interval, and their natural affinity is not alluded to. The treatment the section has received at the hands of Mr. Taubert in Engler's *Natürlichen Pflanzenfamilien* is even more disconcerting. There, only one of the two species is admitted into the section, and Mr. Taubert does not tell us which of the two it is that he excludes.

4. ATYLOSIA SERICEA Benth.

Add to localities of the *F. B. I.* :—RAJPUTANA ; Abu, King ! Duthie !

5. ATYLOSIA MOLLIS Benth.

Under this name Mr. Bentham has included two very distinct species, the diagnosis of the two being as follows :—

Leaves beneath densely uniformly grey-downy not reticulate, end-leaflet much longer than broad ; flowers over 1 in. long ; pod 2 in. long, 3 in. wide, 8-10-seeded, transverse depressions between seeds at right angles to the sutures, longer diameter of seeds across the pod *A. mollis*.

Leaves beneath more sparsely brown-pubescent, strongly reticulate, end-leaflet hardly longer than broad ; flowers 75 in. long ; pod 1-1.25 in. long, 6 in. wide, 3-5-seeded, transverse depressions between seeds oblique, longer diameter of seeds parallel to the sutures *A. crassa*.

In the Calcutta Herbarium the writer has analysed specimens of ten gatherings of *A. mollis* and thirty-nine gatherings of *A. crassa*, but has failed to find any intermediate state.

The distribution of the two species is quite distinct also. *A. mollis* is confined to the Himalayas from 2000 feet upwards ; *A. crassa* does not enter the Himalaya proper though it extends from the foot of that range through the greater part of

India, Indo-China and Malaya. The synonymy and distribution of the two plants are as follows:—

5a. *ATYLOSIA MOLLIS* Benth in *Pl. Jungh.* 243; *Bak. in Flor. Brit. Ind.* ii. 213 as to the synonym *Collæa mollis* only. *Collæa mollis* Grah. in *Wall. Cat.* 5574.

NORTH-WEST HIMALAYA; Chamba, *Clarke* 24283! Kamaon at Chajoorie, *Duthie* 530! Garhwal; below Kinali, *Duthie* 3951! Route to Tehri, *Davidson*! NEPAL; *Wallich* 5574! SIKKIM; Rinchiongong, *T. Thomson*! *T. Anderson*! Siriong, *Clarke* 13137! Lingcham, *Clarke* 25485! Namchi, *King*!

5b. *ATYLOSIA CRASSA* Prain, *Journ. As. Soc. Beng.* lxvi. 2, 45. *A. mollis* Benth. in *Pl. Jungh.* 343 excluding the synonym *Collæa mollis* Grah.; *Bak. in Flor. Brit. Ind.* ii. 213, exc. the synonyms *Collæa mollis* Grah., *Cajanus glandulosus* Dalz. & Gibs., and *Atylosia glandulosa* Dalz. *Dolichos reticulatus* Ham. in *Wall. Cat.* 5552, not of Ait. *D. crassus* Grah. in *Wall. Cat.* 5553. *Dunbaria Horsfieldii* Miq. *Flor. Ind. Bat.* i. 179. *Collæa cinerascens* Grah. in *Wall. Cat.* 5575.

FOOT of the N.-W. HIMALAYA; Hardwar, *Wallich*! Kamaon Bhabar, *King*! Dehra Dun, *King*! NEPAL; Terai at Noakote, *Wallich* 5552! ROHILKUND; *T. Thomson*! N. OUDH; *R. Thompson*! BENGAL; Maldah, *Clarke* 26977! CHOTA NAGPORE; *Wood*! *Gamble*! C. INDIA; Sambalpore, *Griffith*! Pachmarhi, *Duthie*, 10372! S. INDIA; Ganjam, *Gamble* 13658! Rampa, *Gamble* 16027! Vizagapatam, *Gamble* 21775! Jaipur Hills, *Beddome*! CONCAN; *Stocks*! *Dalzell*! ASSAM; Brahmaputra Valley, *Jenkins*! Garo Hills, at 300 feet, *Clarke* 43126! BURMA; common everywhere from Pegu and Bhamo to the Shan Plateau and the Karen Hills. ANDAMANS; very common. DISTRIB. Java, Philippines.

The citation of *Atylosia glandulosa* as a synonym of this or of the preceding plant is no doubt a *lapsus calami*, since *Dalzell* describes his species as having solitary pedicels reflexed in fruit, pods with long spreading hairs bulbous at their bases, and a vexillum with 2 callosities. Both *A. mollis* and *A. crassa* have geminate pedicels as described by Mr. Baker, their pods are not covered with long hairs, and they do not have callosities on the vexilla. One result of the slip has, however, been that a little farther on the species already described by *Dalzell* as *A. glandulosa*, is redescribed in the *F. B. I.* as *Atylosia rostrata*. That species as it happens is, moreover, not an *Atylosia* at all but a *Dunbaria*.

The oldest name for *A. crassa* as a species is *Dolichos reticulatus* Ham. But there is already an older *Dolichos reticulatus* from Australia published in the first edition of Aiton's *Hortus Kewensis*. As that also happens to be an *Atylosia* and now bears the name *A. reticulata* Benth., the writer has appropriated the specific epithet from the next oldest synonym, *Dolichos crassus*. Of *Dolichos blandus*, referred here by Mr. Baker, the writer has seen no specimen, and therefore refrains from giving the synonym a place.

5c. *ATYLOSIA BURMANICA* Coll. & Hemsl. in *Journ. Linn. Soc.* xxviii.

48; branches and leaves beneath shortly densely grey-downy, stipules minute caducous, pod tomentose with long silky hairs.

BURMA; Shan Hills, 5000 feet, *Collett 95!* Maymyo, *King's Collectors!*

Branches and stems as in *A. crassa* and *A. mollis*. Leaves exactly as in *A. crassa*; flowers larger, 1-1.25 in. long, like those of *A. mollis*, but rather more numerous. Pods as in *A. crassa* except for being clothed with long spreading hairs.

There is no doubt that this is exceedingly nearly related to *A. crassa* and to *A. mollis*; it has the foliage of the former with the flowers of the latter but differs equally from both by its tomentose pods.

7. *ATYLOSIA KULNENSIS* Dalz.

This species has no existence, the plant on which it is based being simply *Dunbaria Heynei* W. & A., from a different locality.

8. *ATYLOSIA GRANDIFLORA* Benth.

This species is not represented in Herb. Calcutta; the description given in the *F. B. I.* would apply without difficulty to *Dunbaria pulchra* Benth.

SUBGEN II. *CANTHAROSPERMUM*. This subgenus ought, in the writer's opinion, to receive the generic rank postulated for it by Wight and Arnott.

11. *ATYLOSIA ELONGATA* Benth.

The nearest ally of this species is *A. platycarpa*, along with which it forms the somewhat distinct section § *Rhynchosiodes* Bth.

14. *ATYLOSIA PLATYCARPA* Benth.

Add to synonyms of *F. B. I.*:—*Atylosia geminiflora* Dalz. in *Journ. Linn. Soc.* xiii. 185; *Bak.* in *Flor. Brit. Ind.* ii. 212.

Add to localities:—BEHAR; *Kurz!* C. INDIA; Jubbulpur, *Beddome!* Sagor, *Jerdon!*

15. *ATYLOSIA ROSTRATA* Bak.

This is the plant described by Dalzell as *A. glandulosa* but reduced in the *F. B. I.* to *A. mollis*. It is not an *Atylosia* but a *Dunbaria*.

81. *DUNBARIA* W. & A.

2. *DUNBARIA HEYNEI* W. & A. Add to synonyms:—*Atylosia kulnensis* Dalz. in *Journ. Linn. Soc.* xiii. 186; *Bak.* in *Flor. Brit. Ind.* ii. 214. *Cajanus kulnensis* Dalz. in *Kew Journ.* ii. 264; *Dalz & Gibs. Bomb. Flora*, 72.

Add to localities of *F. B. I.*:—CONCAN; near Kulna in the Waree country, *Stocks!* *Dalzell!* *Gibson!* CANARA; Wadde Ghaut, *Talbot!*

An examination of Dalzell's original specimens on which the species *Cajanus kulnensis* was founded, shows that they belong to a *Dunbaria* differing in no respect from *D. Heynei*.

36. *DUNBARIA GLANDULOSA* Prain. *Dunbaria Heynei* *Kurz MSS.* in *Herb. Calcutta* vix W. & A. *Atylosia rostrata* *Bak.* in *Flor. Brit. Ind.*

ii. 216. *Atylosia glandulosa* Dalz. in *Journ. Linn. Soc.* xiii. 185. *Cajanus glandulosus* Dalz. & Gibs. *Bomb. Flora*, 73.

CONCAN; *Stocks!* CENTRAL INDIA; Godavery jungles, *Beddome!* Sagor, *Jerdon!* BENGAL; Mymensingh, *Clarke* 7800! BURMA; South Shan States at Lwekaw, *King's Collectors!*

There is no doubt that this is a *Dunbaria* but it is not, as Mr. Kurz was inclined to think, the same as the preceding. Mr. Baker's description is very good, but it does not mention the distinct callosities on the vexillum which mark it unmistakeably as a *Dunbaria*; the fact has been overlooked that it was already a described species. The name *Atylosia glandulosa*, under which it is described by Dalzell, has been cited in the *Flora of British India* as a synonym of *Atylosia mollis*. Dalzell's description of the species, however, calls attention to the calli on the vexillum, the bulbous-based hairs on the pods and the retrofracted solitary pedicels, whereas neither in *A. mollis*, nor in the species *A. crassa* which is mixed with *A. mollis*, do we find long hairs on the pods, neither have calli on the vexillum, neither have retrofracted pedicels; finally, in both the pedicels are geminate.

3c. DUNBARIA FUSCA Kurz in *Journ. As. Soc. Beng.* xliii. 2. 186; xlv. 2. 255. *Phaseolus fuscus* Wall. *Pl. As. Rar.* i. t. 6; *Cat.* 5613; *Bth. & H. f. Gen. Pl.* i. 539; *Bak.* in *Flor. Brit. Ind.* ii. 204.

This species has been already referred to under *Phaseolus*.

In the *Genera Plantarum* the figure of this species is—obviously by oversight, for its pod is flat not terete, and its valves thin not thick,—quoted as that of a *Phaseolus* § *Dysolobium*.

It is not a *Phaseolus* at all; its style is glabrous, not bearded, its stigma capitate not oblique; the keel though beaked and with the beak moreover hooked, is not deflexed; more important still, the rachis is not nodiform. Finally the leaves are glandular beneath and though Dr. Wallich describes the leaves as having small deciduous stipels he figures none, and none of his specimens have any. But apart from the character of stipels the plant is certainly, as Kurz has pointed out, a *Dunbaria*; the mere presence of stipels has not been held by Mr. Bentham sufficient to outweigh all the other characters that go to distinguish the *Cajaneæ*—the subtribe to which *Dunbaria* belongs.

3d. DUNBARIA BELLA Prain; stems glabrescent, stipules caducous, leaflets subcoriaceous, shortly hispid especially on the nerves above, trinerved and distinctly reticulate-veined, softly pubescent beneath, lanceolate-acute three times as long as broad, flowers in peduncled lax racemes, calyx-teeth short, corolla much exserted, pod recurved velvety 8-10-seeded.

BURMA; Southern Shan States at Lwekaw, *King's Collectors!* Tenasserim, *Gallatly!*

A woody climber. Branches firm terete at first sparsely puberulous. Petiole 1·5 in., stipels 0; leaflets 3·5 in. long, 1-1·25 in. wide, petiolules very short. Racemes overtopping the leaves, flowers rather smaller than, but as showy as in *D. rostrata*; pedicels ·5-·7 in. Calyx ·35 in., broadly campanulate, glabrescent, all the teeth shorter than the tube. Corolla ·6 in. long, keel broad-beaked; standard ·75 in. across,

emarginate. *Pod* linear, 3·5 in. long, '5 in. wide, abruptly narrowed at tip, abruptly recurved at pedicel, closely softly velvety.

A very distinct and handsome species.

3e. *DUNBARIA SCORTECHINII* *Prain, Journ. As. Soc. Beng.* lxvi. 2. 44; a slender climber, branches grey-velvety, leaflets exstipellate roundish-rhomboidal cuspidate, subcoriaceous, sparsely puberulous above, densely white-canescens below, flowers in long-peduncled rather dense racemes, calyx-teeth short, corolla exserted, pod recurved densely grey-canescens, 6-8-seeded.

PERAK; Dijong, *Scortechini* n. 1841! *Kunstler* n. 908! Ulu Bubong, *Kunstler* n. 10852!

Stem slender firm slightly sulcate, 10-20 feet long. *Petiole* 2-3 in., stipules small caducous; leaflets 2·5 in. long, 2 in. wide, petiolules '15 in., minutely stipellate. *Racemes* overtopping the leaves, on peduncles 4 in. long, grey-velvety like the stems; pedicels geminate '2 in. long. *Calyx* '3 in., lower tooth nearly as long as tube. *Corolla* '5 in. long, dark-brown externally, pale-yellow within, standard '6 in. across, orbicular entire. *Pod* linear, distinctly lineate, 2·5 in. long, '25 in. wide, narrowed at tip, abruptly recurved at pedicel, closely softly grey-canescens.

Also a very distinct species; distinguished from *Atylosia*, as *D. rostrata* and *D. bella* are, mainly by the pods not being depressed between the seeds.

84. RHYNCHOSIA LOUR.

1. RHYNCHOSIA RUFESCENS DC.

Add to localities of *F. B. I.* :—

ASSAM; Brahmaputra Valley, common, *Simons!* *Jenkins!* *Mann!*
BURMA; Katha, *J. Anderson!* Mingyin Hills, *Prazer!*

4. RHYNCHOSIA AUREA DC.

In the *Flora of British India* this is made to include *R. capitata* DC.; from the field-botanist's point of view this is not entirely necessary as the two plants cannot be confused. The diagnosis between the two forms is as follows :—

Racemes few-flowered, peduncle shorter than the leaves, naked;
standard striped longitudinally with purple veins ... *R. aurea*.

Racemes many-flowered, peduncles longer than the leaves, with a
slender leafless abortive shoot springing from near the middle;
standard yellow without purple stripes ... *R. capitata*.

It is of little consequence whether we follow De Candolle and Wight and Arnott in treating the two as distinct species, or if we merely treat *R. capitata* as a variety of *R. aurea*. But it will be observed that the name "aurea" is rather more applicable to the plant to which it does not truly belong, than to the other.

6. RHYNCHOSIA SUAVEOLENS DC.

Add to localities of *F. B. I.* :—

UPPER BURMA; Kyaukse, Sagaing, Collen, etc., everywhere common,
King's Collectors!

7. RHYNCHOSIA AVENSIS Benth.

Excellent specimens of this plant have been recently received from Maymyo.

This is said to be the same species as *Atylosia candicans* Kurz, in *Journ. As. Soc. Beng.* xliii. pt. 2. 186. Had such been really the case, the publication of a different MSS. specific name for the plant as a *Rhynchosia* was obviously unnecessary. And as there are some well-meaning but injudicious bibliographers who will hasten, if they read this note, to change the name, it is necessary to protect them against themselves and explain how matters stand.

Dr. Wallich issued two separate plants as *Dolichos candicans* Wall. *Cat.* 5567 and *Cajanus? candicans* Wall. *Cat.* 5576 respectively. These two plants resemble each other in that both have leaves woolly beneath; they differ totally in shape of leaflets. Mr. Kurz has however considered them conspecific and has based his "*Atylosia candicans*" on both. It is true that his description of *A. candicans* must apply mainly to *Cajanus? candicans*, for Mr. Kurz, in disposing of *Dolichos candicans*, ventured to do so although only one specimen was available to him for study and that specimen has neither flowers nor fruit.

By the rule that purists in nomenclature are so desirous of applying with Draconic rigidity it follows that the specific epithet "*candicans*," granted always that both the plants are *Rhynchosias*, must go to Wall. *Cat.* 5567 as the earlier number; Wall. *Cat.* 5576, the plant under discussion, being congeneric with the other but certainly not conspecific, had to receive a new epithet and has therefore been named *R. avensis* by Mr. Benth. Mr. Kurz, in the Society's *Journal* xlv. pt. 2, 258, has by oversight transposed the citations and has identified *R. avensis* with precisely the plant that Mr. Benth. *did not* designate by that name.

15. RHYNCHOSIA PILOSA Wall.

Dr. King's collectors have recently sent this from Sagaen, the locality in which it was originally discovered by Dr. Wallich. The pod is remarkably like the pod of *R. aurea* and the species must be transferred to § *Nomismia*.

20. RHYNCHOSIA BRACTEATA Benth.

Add to synonyms of *F. B. I.*:—*Rhynchosia mollissima* Dalz. in *Journ. Linn. Soc.* xiii. 186.

The original specimens on which Mr. Dalzell founded his *R. mollissima* are absolutely typical examples of *Dolichos bracteatus* Wall. Dalzell's name is the first that was given to the plant in its proper genus, but there are at least three other plants to which the name *R. mollissima* has been applied; it is therefore better to abandon Dalzell's name and to use Benth. one, which has the further merit of conserving the oldest specific epithet.

21. RHYNCHOSIA ACUTISSIMA Thwaites.

Add to localities of *F. B. I.*:—SIKKIM; Terai at Bamanpokri, Gamble! ASSAM; Brahmaputra Valley, Mann!

22. RHYNCHOSIA DENSIFLORA DC.

Add to localities of *F. B. I.*:—BURMA; Sagaen, Wallich 5499 E! King's Collectors! Shan Plateau, common everywhere.

85. FLEMINGIA ROXB.

SUBGEN 1. OSTRYDIUM Desv.

Mr. Baker has reduced all the forms of this section, except *F. Chappar*, to *F. strobilifera* R. Br.; the impossibility of adopting this course is obvious to those

who know the plants as they grow. The section includes four very distinct and easily recognisable Indian species; no forms connecting one with another have hitherto been found. The following key will enable their separation:—

Erect shrubs 5–10 feet high; (leaves oblong or ovate-lanceolate, acute, rounded at base); bracts $\frac{3}{4}$ –1 in. long:—

Lateral nerves all subequal 8–10 pairs; bracts 1 in., finely puberulous, usually all obscurely cuspidate (sometimes the highest slightly emarginate) ... 1. *F. strobilifera*.

Lateral nerves 4–6 pairs, the basal pair longer, stronger and more oblique than the rest; bracts $\frac{3}{4}$ in. softly hirsute with long hairs usually all slightly emarginate (sometimes the lowest obscurely cuspidate) ... 2. *F. bracteata*.

Low shrubs 1–3 feet high; bracts emarginate $\frac{3}{8}$ – $\frac{1}{2}$ in. long:—
Leaves ovate subacute or obtuse with subcordate base, bract $\frac{5}{8}$ in. long, sparsely hirsute on the nerves with long adpressed hairs; habit trailing ... 3. *F. fruticulosa*.

Leaves lanceolate with cuneate base; bracts $\frac{3}{8}$ in. long, softly pubescent with long spreading white hairs ... 4. *F. fluminalis*.

1. *FLEMINGIA STROBILIFERA* R. Br.: Bak. in *Flor. Brit. Ind.* ii. 227 (as to the typical form only).

This species has never been collected in the Himalayas. The following are the localities from which specimens in Herb. Calcutta have been reported.

SCINDE; *Campbell!* RAJPUTANA; *King!* C. INDIA; *Vicary!* *Jerdon!* *Duthie!* CONCAN; *Stocks!* *Gibson!* DECCAN; *Cooke!* *Balaji Nene!* CARNATIC; *Heyne!* NALAMALLAI HILLS; *Sim!* CEYLON; *Beckett!* CHOTA NAGPUR; *Wood!* *Gamble!* BEHAR; *Ball!* *Hooker!* ASSAM; *Griffith!* *Mann!* *Jenkins!* *Simons!* *Peal!* SILHET; *Wallich!* KHASIA; *Clarke!* JAINTEA; *Rita!* NAGA HILLS; *Masters!* *Collett!* LUSHAI; *Prazer!* CHITTAGONG; *Clarke!* *Gamble!* *King's Collector!* CHIN HILLS; *King's Collectors!* YUNNAN; *Anderson!* PEGU; *Kurz!* TENASSERIM; *Falconer!* ANDAMANS; *Man!* *King's Collectors!* NICOBARS; *Jelinek!* *Kurz!* PERAK; *Scortechini!* *Kunstler!* PAHANG; *Ridley!* SINGAPORE; *Hullett!* PENANG; *Wallich!* *Scott!* MALACCA; *Griffith!* SELANGOR; *Ridley's Collector!* JAVA; *Kurz!* *Anderson!* CELEBES; *Barclay!* SIAM; *Schomburgk!* MAURITIUS; introd., (no collector's name!) JAMAICA; introd., *Lane!*

1b. *FLEMINGIA BRACTEATA* Wight, *l.c.* t. 268. *F. strobilifera* var. *bracteata* Bak. in *Flor. Brit. Ind.* ii. 227.

The following are the localities from which specimens of this species have been reported to Herb. Calcutta; it is by no means confined to the Eastern Himalaya and Burma; not a single Himalayan specimen has been sent from so high up as 1000 feet though it occurs all along the foot of the hills from the Kamaon Bhabar to the Eastern Duars.

NILGHIRIS; *Wight!* CONCAN; *Ritchie!* CANARA; *Talbot!* C. INDIA;

R. Thompson! Duthie! OUDH; *R. Thompson!* CHOTA NAGPUR; *Clarke!* Gumble! BEHAR; *T. Thomson!* *Clarke!* GARHWAL; Bhabar, *King!* KAMAON; Terai, *King!* NEPAL; Terai, *Scully!* *Hieronymus!* SIKKIM; Terai, *Kurz!* *Clarke!* BOOTAN; Duars, *Simons!* UPPER BURMA; *Anderson!* *King's Collectors!* PEGU; *McLelland!* *Brandis!* *Kurz!* YUNNAN; *Anderson!* SHAN HILLS; *Fulton!* TENASSERIM; *Gallatly!*

1c. *FLEMINGIA FRUTICULOSA* Wall.

The following are the localities for this species so far as is known; as will be seen it is not confined to the Central Himalaya.

N.-W. HIMALAYA; Simla, dry spots in sunny woods, 7000 feet, *Griffith!* *J. Anderson!* near Simla at 5000 ft., *Gamble!* Dalhousie, *Clarke* n. 33! *Clarke* n. 22076! Mattiana, 5000 feet, *Brandis!* Garhwal, near Owra, 6-7000 feet, *Duthie!* Kamaon, *King!* A specimen of this collected by Dr. T. Thomson, but with no precise locality, has been issued in *Herb. Ind. Or.* as *F. strobilifera* and has been noted as occurring at 1000 feet; no other botanist has met with the plant so low down. CENTL. HIMALAYA; Nepal, *Wallich* n. 5754!

1d. *FLEMINGIA PLUMINALIS* C. B. *Clarke* MSS.; leaves narrowly lanceolate, base cuneate; bracts subsecundly disposed, softly pubescent emarginate.

CHITTAGONG; Demagri, *Clarke* n. 19777! Burkul, *Lister* n. 117! BURMA; Hukong Valley, *Griffith* n. 1675! Pegu, *Kurz* n. 2524! Shan Plateau at Makhoye, *King's Collector!*

A small shrub 1-3 feet high; branches slender fluted, twiggy, velvety. Leaves subcoriaceous 2.5 in. long, .6 in. wide, green, adpressed-pubescent, above sparsely beneath densely; lateral nerves very oblique about 8 pairs, stipules scarious linear .3 in. long. Racemes 2-4 in. long; bracts erecto-patent, short-petioled, cordate, .4 in. long, all faintly emarginate. Calyx .2 in., finely pilose; teeth lanceolate exceeding the tube. Corolla pale, little exserted.

A very distinct form, evidently quite entitled to specific rank.

2. *FLEMINGIA CHAPPAR* Ham.

This species is quite common immediately to the south of Behar; it has been collected at Sambalpur by Griffith and in Ganjam by Gamble.

3. *FLEMINGIA PANICULATA* Wall.

This species is quite common in Upper Burma and has recently been repeatedly sent from the Chindwin Valley, from the Ruby Mines district, and from the Shan Plateau.

4. *FLEMINGIA LINEATA* Roxb.

VAR. *glutinosa* var. nov.; leaflets larger acute, flowers rather larger, all parts closely beset with sticky glandular hairs.

BURMA; S. Shan States at Taungyi, *King's Collector!* TENASSERIM; on Taepo, 5000 feet, *Gallatly!*

This will probably require to be recognised at some future time as specifically distinct.

5b. *FLEMINGIA PRÆCOX* C. B. Clarke MSS.; branches terete, leaflets thin large acuminate glabrous, bracts linear firm hardly exceeding the buds, calyx-tube ribbed glabrescent, teeth thinly silky.

CHITTAGONG; *Clarke* 19916! CENTL. PROVINCES; Chanda, *Duthie* 9408!

A tall shrub; woody subtriquetrous stems quite glabrous. *Stipules* medium; scariose, soon falling; petiole 3-4 in., triquetrous, deeply sulcate, slightly winged, leaflets subcoriaceous, 4-10 in. long, oblong narrowed to both ends, glabrous on both surfaces except for the faintly puberulous prominent midrib and 12-24 pairs of parallel oblique lateral veins beneath. *Racemes* dense, narrowly cylindric, 2-3 in. long, bracts overlapping, rigidly scariose, the longest only .25 in. long, margins silky otherwise glabrous; pedicels very short. *Calyx* .25 in., teeth linear, the lowest twice as long as the rest. *Corolla* as long as the lowest calyx-tooth.

A very distinct species, nearest to *F. stricta* and with similar foliage, but with totally different bracts.

6. *FLEMINGIA GRAHAMIANA* W. & A.

Add to localities of *F. B. I.*:—BURMA; Shan Hills at Taungyi, *Collett*! Makhoye, etc., *King's Collectors*!

This is the plant alluded to under *Flemingia congesta* by Sir H. Collett and Mr. Hemsley (*Journ. Linn. Soc.* xxviii.) as a variety with clustered racemes.

7. *FLEMINGIA CONGESTA* Roxb.

This name in the *Flora of British India* is made to include a number of distinct and quite unmistakeable species. Some of these are treated as distinct varieties, others are simply merged in the type or in or other of these varieties. The following key may assist in distinguishing the plants themselves.

Erect woody undershrubs with rather tall stems:—

Racemes condensed shorter than the petioles:—

Calyx teeth longer than the tube, leaves green beneath:—

Bracts and calyx sparsely grey-silky *F. congesta.*

Bracts and calyx adpressed tawny-pubescent *F. prostrata.*

Calyx teeth shorter than the tube, leaves rusty beneath, the

flowers very small *F. ferruginea.*

Racemes elongated exceeding the petioles:—

Leaves densely uniformly rusty-tomentose beneath, petioles

not winged... .. *F. Wightiana.*

Leaves pubescent only on the nerves beneath, petioles slightly winged:—

Bracts and calyx densely brown-silky, leaves reddish beneath,

racemes not so long as leaves *F. latifolia.*

Bracts and calyx sparsely grey-silky, racemes rather lax as

long as the leaves *F. semialata.*

Low shrubs with a woody subteranean stem:—

Bracts and calyx glabrous or with short close pubescence *F. nana.*

Bracts and calyx with long silky pubescence *F. sericans.*

[The last species given in the key is united by Mr. Baker with *F. Wallichii* and not with *F. congesta*.]

The synonyms and distribution of these different species are as follows :—

7a. *FLEMINGIA CONGESTA* Roxb. *Hort. Beng.* 56; *Flor. Ind.* iii. 340; *DC. Prodr.* ii. 351; *W. & A. Prodr.* 241; *Wight, Ic.* t. 390; *Dalz. & Gibbs. Bomb. Fl.* 75; *Wall. Cat.* 5747 (for the most part); *Miq. Flor. Ind. Bat.* i. 164; *Bak. in Flor. Brit. Ind.* ii. 228 (excl. syn. *F. angustifolia* Roxb. and all the varieties); *Kurz in Journ. As. Soc. Beng.* xlv. 2. 260. *Crotalaria macrophylla* Willd. *Sp. Pl.* iii. 982. *Rhynchosia crotalarioides* DC. *Prodr.* ii. 387.

Of this there are two very distinct varieties :—

VAR. a. typica; petioles not winged, leaves dark-green. (To this variety belong all the synonyms cited above).

Common everywhere throughout India, British Indo-China and the Malay Peninsula. Owing to this having been first described as *Crotalaria macrophylla*, Dr. O. Kuntze has taken the opportunity of employing the name "*F. macrophylla* Kuntze," with what precise significance he has failed to make clear.

VAR. β. viridis; petioles distinctly winged, leaves thinner and pale-green. *Flemingia semialata* Wall. *Cat.* 5746 D. (not at all of Roxb.) *F. semialata VAR. viridis* Kurz in *Journ. As. Soc. Beng.* xlv. 2. 261.

CONCAN; Stocks! Gibson! Vingorla, T. Cooke! BEHAR; Bettiah, Hieronymus! BURMA; Prome, Wallich 5746 D! Rangoon, Cleghorn! Pegu, Kurz! Brandis! Shan Hills, common, King's Collectors! TENASSERIM; Migatoom, Gallatly!

This variety, though very widespread in Burma, seems to be rare in India.

7b. *FLEMINGIA PROSTRATA* Roxb. *Flor. Ind.* iii. 338; *Benth. in Pl. Jungh.* 245; *Kurz in Journ. As. Soc. Beng.* xlv. 2. 260. *F. angustifolia* Roxb. *Flor. Ind.* iii. 341. *F. congesta* Bak. (in part) and *F. congesta VAR. semialata* Bak. (in part) loc. cit., but not at all either *F. congesta* or *F. semialata* of Roxb.

HARDWAR; Hardwicke. NORTH BENGAL; Titalya, Kurz! EAST BENGAL; Mymensingh, Clarke 7830! Comilla, Clarke 14228! ASSAM; Sadiya, G. Gammie! KHASIA; Hooker and Thomson! G. Mann! Clarke 18667! 38916! 40327! BURMA; Shan Hills, Collett 411! Martaban, Kurz! *DISTRIB.* China (Hupeh, Henry n. 1640).

The Comilla, the Sadiya, the Burmese, and some of the Khasia specimens accord well with the description given by Roxburgh of *F. prostrata*, which was not described by him from Indian specimens but from plants raised from Chinese seeds; the remainder either accord with *F. angustifolia* or serve to connect the two plants.

7c. *FLEMINGIA FERRUGINEA* Grah. in Wall. *Cat.* 5750; *Benth. in Pl. Jungh.* 245; *Kurz in Journ. As. Soc. Beng.* xlv. 2. 260. *F. congesta VAR. Wightiana* Bak. in *Flor. Brit. Ind.* ii. 229 in part, not *F. Wightiana* Grah.

BURMA; Pegu and Shan Hills, very common.

This is the most easily separated of all the "Congesta" group, owing to the extreme smallness of its flowers. The form with which it might most easily be confused is *F. congesta* VAR. *viridis*; in this case, however, besides the smaller flowers, the red colour of the leaves beneath at once effects a diagnosis.

7d. FLEMINGIA WIGHTIANA *Grah.* in *Wall. Cat.* 5751; *W. & A. Prodr.* 242. *F. congesta* VAR. *Wightiana* *Bak.* in *Flor. Brit. Ind.* ii. 229 (*excl. syn. F. ferruginea Grah.*)

NILGHIRIS; *Wight!*

Almost as easily separated as the preceding, in this case owing to the soft uniform pubescence on the leaflets beneath. It might most readily be mistaken for *F. Grahamiana* but its leaves are more densely pubescent and its bracts are not at all rigid.

7e. FLEMINGIA LATIFOLIA *Benth.* in *Pl. Jungh.* 246; *Miq. Flor. Ind. Bat.* i. 163. *F. congesta* VAR. *latifolia* *Bak.* in *Flor. Brit. Ind.* ii. 229.

Of this very distinct species there are two marked varieties:—

VAR. *a. typica*; bracts not broader than calyx, racemes more lax. *F. latifolia* VAR. *genuina* *Kurz* in *Journ. As. Soc. Beng.* xlv. 2. 261.

KHASIA; *Hooker and Thomson!* NAGA HILLS; *Masters!* BURMA; *Maymyo, King's Collector!* DISTRIB. Java.

This most resembles *F. congesta*, but its bracts are broader, its racemes longer, its flowers larger; the bracts and calyx are densely brown-silky, and the leaves beneath have a reddish tinge from the sparse rusty tomentum on the nerves.

VAR. *β. grandiflora* *Kurz loc. cit.*; bracts broader than calyx, racemes dense at first strobilate, flowers larger.

BURMA; Pegu, *Kurz* 1636! Shan Hills, *King's Collector!*

A very distinct variety that it may yet be necessary to raise to specific rank.

7f. FLEMINGIA SEMIALATA *Roxb. Hort. Beng.* 56; *Flor. Ind.* iii. 340; *Don. Prodr.* 242; *W. & A. Prodr.* 241; *Wight, Ic.* t. 326; *Wall. Cat.* 5746 (*mainly, but excluding letters E and G*). *F. congesta* VAR. *semialata* *Bak.* in *Flor. Brit. Ind.* ii. 229 (*excl. syn. F. prostrata Roxb.*)

HIMALAYAS; from Chamba to Bootan. KHASIA, NAGA and MANIPUR Hills. BEHAR; on Parasnath, *Hooker! Thomson! Anderson! Wood!* NILGHIRIS; *Wight!*

This cannot be mistaken for any of the preceding species owing to its long lax racemes; it has not yet been sent to Calcutta from Burma, Malaya or China.

7g. FLEMINGIA NANA *Roxb. Hort. Beng.* 56; *Fl. Ind.* iii. 339; *Wight, Ic.* t. 389. *F. congesta* VAR. *nana* *Bak.* in *Flor. Brit. Ind.* ii. 229 (*as to the foregoing citations only but not at all as to the plant described.*)

CANARA; Dongi, *Talbot* 960! C. INDIA; Sagor, *Jerdon!* BEHAR; Pachet, *Kurz!* Maunbhum, *V. Ball! Campbell!*

This could only be mistaken for the next species, not by any possibility for any of the preceding; the diagnosis as will be seen from the key is, however, sufficiently easy.

To what plant the *F. B. I.* diagnosis of *VAR. nana* refers it is impossible to ascertain because there is no example of *Wall. Cat.* 5748 A. or of *Wall. Cat.* 5749 at Calcutta. *Wall. Cat.* 5748 B., which is here, is certainly quite distinct specifically from Roxburgh's species.

Wight, *Icones* t. 389, is a black and white reproduction of Dr. Roxburgh's own excellent coloured drawing of this species. And Wight's, *Icones* t. 408, is a similar reproduction of the totally different *F. procumbens* Roxb. which has been redescribed in the *F. B. I.* under the name *F. vestita*.

7h. *FLEMINGIA SERICANS* Kurz in *Journ. As. Soc. Beng.* xliii. 2. 186; *Coll. & Hemsl. in Journ. Linn. Soc.* xxviii. 50. *F. Wallichii* Bak. in *Flor. Brit. Ind.* ii. 229 in part, not of W. & A. *F. nana* Wall. *Cat.* 5748 B. not of Roxb.

BURMA; Pegu, Kurz! Prome, Wallich! Shan Hills, Collett!

This is undoubtedly correctly restored to specific rank by Sir H. Collett and Mr. Hemsley. After dissecting flowers of all the Calcutta specimens both of this and of *F. nana* the writer is convinced that the two cannot be united. The nearest ally of *F. sericans* is in reality *F. ferruginea*.

8. *FLEMINGIA WALLICHII* W. & A.

Delete from synonyms of *F. B. I.*, both *F. nana* Wall., and *F. sericans* Kurz.

Delete from localities:—Prome and Martaban.

10. *FLEMINGIA PROCUMBENS* Roxb. *Hort. Beng.* 56; *Flor. Ind.* iii. 338; Wight *Ic.* t. 408. *F. vestita* Benth. ex Bak. in *Flor. Brit. Ind.* ii. 230. *Dolichos vestitus* Grah. in *Wall. Cat.* 5545.

Roxburgh's original coloured drawing of *F. procumbens*, of which Wight's quoted figure is but a rough copy, shows that the species has nothing whatever in common with *F. nana*, but that it is on the contrary an excellent representation of the plant afterwards issued by Wallich as *Dolichos vestitus* and described since, in the *F. B. I.*, as *Flemingia vestita*.

86. *DALBERGIA* LINN. FIL.

[The oldest name for this genus is *Amerimnon* Browne, *Hist. Jamaic.* 288, t. 31, f. 3; this has been pointed out by Sir J. D. Hooker and Mr. Jackson in their *Index Kewensis* and by Dr. O. Kuntze in his *Rev. Gen. Pl.* i. 158.]

2. *DALBERGIA LATIFOLIA* Roxb.

It is singular that no one since the end of last century has found in the Andaman group *Dalbergia emarginata* Roxb. which both Mr. Bentham and Mr. Baker declare to be identical with the same author's *D. latifolia*. Perhaps it occurs in the little explored Northern Island where at one time a settlement existed, but which no one visits now.

Dalbergia sissoides Grah., treated in the *F. B. I.* as a variety of *D. latifolia*, is apparently a distinct species, differing in flowers as well as in leaves. Mr. Baker further suggests that *D. javanica* Miq. may be same as *D. sissoides*; it differs somewhat in the greater persistence of the obovate bracteoles that embrace the bud. But specimens that Messrs. Koorders and Valetton have recently issued, and others kindly sent from Java by Dr. Treub, show that Mr. Baker is perhaps justified in reducing *D. javanica* to *D. latifolia*.

3. *DALBERGIA OVATA* Grah.

Mr. Kurz keeps *D. glauca* separate from *D. ovata* as a species; in this he is perhaps right. *D. glauca* is the plant described in the *F. B. I.* as *D. ovata* VAR. *obtusifolia*.

4. *DALBERGIA PSEUDO-SISSOO* Miq.

Add to localities of *F. B. I.*:—MALAY PENINSULA; very common everywhere. *DISTRIB.* Borneo.

This is really, as Mr. Baker suggests, the same as *D. pseudo-sissoo* Miq. and Dr. Miquel's name, being the earlier, is the one that must be used for the species. For material of Dr. Miquel's species as well as for notes and drawings from all the types preserved in the Leyden Herbarium the writer is indebted to the great kindness of Mr. Suringar, who has also proved that *D. Sissoo* Miq. is not *D. Sissoo* Roxb. but is simply another form of the present species.

4b. *DALBERGIA HULLETTII* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 119; a small tree, leafless when flowering; flowers in short clustered racemes emerging from tufts of small rusty-pubescent triangular bracts in axils of fallen leaves, lowest pedicels longer than the rest all rusty-pubescent as are the peduncles, petal-claws as long as calyx, pod unknown. *Amerimnou Hullettii* Prain MSS.

SINGAPORE; *Hullett*!

Branches glabrous rugose black, numerous blackish rugose rusty-puberulous branchlets densely covered with numerous clusters of racemes 1-1.5 in. long, laxly rusty-pubescent. Lowest pedicels .3 in. long; bracteoles at base of calyx subulate very small. Calyx campanulate, densely rusty-tomentose, $\frac{1}{2}$ in. long. Corolla 2-3 times as long as calyx, blade of standard orbicular. Stamens 9, rarely 10, monadelphous. Ovary glabrous with densely pubescent stalk, ovule solitary.

The pod being unknown this may prove a *Sissoa* near *D. pseudo-sissoo* or a *Selenolobium* near *D. monosperma*, the probability being however that it is a *Sissoa*. The nearest ally is an apparently undescribed species from Borneo (*Haviland* n. 2894) which has exactly the inflorescence of Hullett's plant and has flowers that only differ in having the ovary as well as its stipe densely woolly. The Borneo plant (which, by agreement with Mr. Haviland, cannot be described in *Herb. Calcutta*) has leaves with either solitary or trifoliate leaflets, when trifoliate the lateral leaflets are subopposed.

7. *DALBERGIA RUBIGINOSA* Roxb.

Roxburgh says that this has ten stamens; Wight and Arnott say that usually they have found only nine; Bentham, too, says there are only nine. The writer has examined very many flowers and has never found fewer than ten, in one bundle;

Wight and Arnott and Bentham could hardly, however, be mistaken and, at least sometimes, there must be nine.

In the *F. B. I.* it is said of this that it has the habit of *D. monosperma* but that it is readily known by its stamens and ovary. By its ovary it is usually easily known since here there are almost always more than the solitary ovule which marks *D. monosperma*. What exactly is meant by the difference as to the stamens of the two species is not very clear. The *F. B. I.* does not say, with Roxburgh, that there are 10 or, with Bentham, that there are 9 in *D. rubiginosa*. As regards *D. monosperma* however, it says there are two bundles of 5 each, which is never the case in that species. Except that in *D. rubiginosa* the sheath has apparently usually 10, and in *D. monosperma* only 9 filaments there is no difference between the two. They differ, however, decidedly as to leaves, the secondary nerves being more numerous in *D. rubiginosa*, and as to pods those of *D. rubiginosa* being thin membranous and reticulately veined on the wings as well as opposite the seeds. The plant that Mr. Kurz supposed to be this (*Journ. As. Soc. Beng.* xlv. pt. 281) is *D. confertiflora*.

7b. *DALBERGIA GARDNERIANA* Benth. *Journ. Linn. Soc.* iv. *Suppl.* 43.

This was supposed by Gardner to be only a form of *D. rubiginosa* of which it has exactly the pods and the flowers, though the calyx is more woolly, and the leaflets which are of a different shape, are densely rusty underneath; Mr. Bentham has very justly given the species a separate place. Mr. Baker, on the other hand, reduces it to *D. congesta*; the following diagnosis between the two species will indicate their distinctness.

Leaves rounded or obtuse, glabrous and strongly closely reticulate above, densely woolly beneath; calyx woolly; pod thin reticulate everywhere	...	...	...	...	<i>D. Gardneriana.</i>
Leaves retuse or emarginate finely sparingly puberulous on both surfaces, calyx glabrous, pod thick, faintly reticulate opposite seeds, elsewhere smooth	...	...	...	...	<i>D. congesta.</i>

10. *DALBERGIA JUNGHUHNII* Benth.

VAR. typica; leaflets 7-9, oblong, glabrous or slightly puberulous.

PENANG; 500 feet, *Curtis*! SINGAPORE; *Hullett*! MALACCA; *Maingay* 547! *Goodenough* 1383!

VAR. Scortechinii Prain, *Journ. As. Soc. Beng.* lxvi. 2. 115; leaflets 11-15, elliptic, more closely puberulous, as is the inflorescence.

MALACCA; *Maingay* 549! *Scortechinii* 1830! SINGAPORE; *Ridley* 6406! *DISTRIB.* Borneo.

Unfortunately neither Griffith's Malacca plant nor Junghuhn's Sumatra one—the two on which Mr. Bentham founded the species—are at Calcutta. The typical variety, as here distinguished, includes all the specimens at Calcutta issued from Herb. Kew. as *D. Junghuhnii*; the plant separated as *VAR. Scortechinii* has either been distributed unnamed or has been marked variously “near *D. Junghuhnii*” and “near *D. sympathetica*.” It has the flowers of *D. Junghuhnii* exactly, and thus differs from *D. sympathetica* in having rather shorter petals. Its leaflets differ equally from those of *D. Junghuhnii* (as represented by *Curtis*' Penang plant) and those of *D. sympathetica*; considering how closely the species of *Dalbergia* approach each other it may be necessary at some future time to treat *Dalbergia Scortechinii* as specifically distinct. Its pods are, however, at present unknown, and it is more convenient therefore to subordinate it in the meantime to *D. Junghuhnii*.

The question has been raised whether this is the lost *D. parviflora* Roxb. The larger number of leaflets seems to the writer to be a fatal objection. This objection does not perhaps, apply so strongly to typical *D. Junghuhnii*, but there is another strong objection in the shape of the pods, which are described as falcate in *D. parviflora*; this character makes it certain, in the writer's opinion, that, in spite of the great authority of Mr. Benthams and Mr. Baker, the lost *D. parviflora* is to be sought for in the section *Selenobium* Bth. (the genus *Drepanocarpus* E. Mey.) and not in the section *Sissoa* at all. To the objection that *D. parviflora* has monadelphous stamens whereas the *F. B. I.* defines the section *Selenobium* as having the stamens in two bundles of 5 each, it may be answered that this definition is due to an oversight and does not accord with reality, for *D. torta* (*D. monosperma*), which is the type of the section, has, as Mr. Benthams quite correctly says, only monadelphous stamens.

11. *DALBERGIA CONFERTIFLORA* Benth. *D. rubiginosa* Kurz, *Journ. As. Soc. Beng.* xlv. pt. 2. 281 not of Roxb.

Add to localities of *F. B. I.*:—CHITTAGONG; *Lister! King's Collector! BURMA*; *Kurz! ANDAMANS*; very common.

The writer has seen no specimen from Oudh. There are in Herb. Calcutta two from the Concan that profess to belong to this species; one comes from Herb. Ind. Or. H. f. & T. the other from Herb. Dalzell. Both are *D. volubilis*.

12. *DALBERGIA VELUTINA* Benth.

VAR. *Maingayi* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 117; leaves ultimately glabrescent beneath, twigs almost black.

MERGUI; *Griffith! MALACCA*; *Maingay! SINGAPORE*; *Ridley!*

12b. *DALBERGIA COLLETTII* Prain; a tree, leaflets 9–15, ovate with rounded tip or ovate-lanceolate with blunt tip, puberulous above, pubescent beneath, flowers minute in ample terminal panicles with rather lax cymose branches, pedicels and petal-claws very short, pod lanceolate 1–2-seeded with very long stalk and long narrow tapering point. *Dalbergia* sp. *Coll. & Hemsl. Journ. Linn. Soc.* xxviii. 50. *Amerimoon Collettii* Prain MSS.

BURMA; Shan Hills at 4000–5000 ft.; Ywangen, *Collett 723! Lwekaw, King's Collectors!*

A tree 25–30 feet high, branches grey-downy. Leaves grey-puberulous above, persistently rather densely pubescent beneath, leaflets 1.25–2 in. long, .5–1 in. wide, rather firm, reticulately veined, stipules small. Panicles short-peduncled, peduncles and branches densely pubescent, 1.5 in. long, 1 in. broad, the ultimate branchlets forming scorpioid cymes. Calyx pubescent $\frac{1}{2}$ in.; teeth short-triangular. Corolla $\frac{1}{2}$ in. Pod firm, reticulate-veined, 2–3 in. long, .5 in. wide, 1–2-seeded, stalk $\frac{1}{2}$ in. long, point narrowed to an acute tip.

A very distinct species with flowers as in *D. Junghuhnii*, fruits rather like those of *D. lanceolaria*, and leaves a little like those of *D. velutina* with which Sir H. Collett and Mr. Hemsley have compared it. It has, however, very much smaller and very different flowers and stipules. The collectors of the Calcutta Herbarium have recently brought in an abundant supply of fruiting specimens so that a description of the species can now be given. The specimen in young fruit mentioned

by Collett and Hemsley as possibly the same has larger flowers, and proves on examination to be a *Dalbergaria* not a *Sissoa*. Its foliage is, indeed, remarkably like that of *D. Collettii*, but its leaflets are fewer and the tomentum is rusty not grey.

13. *DALBERGIA MELANOXYLON* Guill. & Perr., *Fl. Senegal*, 227, t. 53. (*D. Stocksii* Benth.).

This is more often planted than wild in the Concan and Canara; it goes there, according to a note in the Herbarium of Mr. Talbot, which has been kindly lent for study by its owner, under the name of "Chinese Blackwood." Mr. Benthham has described the stamens of *D. Melanoxylon* as being 10 in number and isadelphous, *i.e.*, in 2 bundles of 5 each. But he quotes the species described and figured by Guillemin and Perrottet, *loc. cit.*, as the plant he intends, in spite of these authors having described as either 9- or 10-stamened, the stamens being monadelphous with the central (vexillary) one rather longer than the others and rather more separated at the top from the lateral groups than the members of these groups are from each other; the figure, too, that Mr. Benthham cites, instead of showing 10 stamens in 2 bundles shows 9 in one bundle, the central one longer than the rest and according in other respects with the description. The description and figure referred to agree absolutely with the characters of Mr. Benthham's *D. Stocksii*, our present plant; after analysing flowers from every example, whether African or Indian, in Herb. Calcutta, the writer is convinced that whatever *D. Melanoxylon* Benth. (*Journ. Linn. Soc. iv. Suppl. 47*) may be, the true *D. Melanoxylon* Guill. & Perr. and *D. Stocksii* Bth. are one species.

14. *DALBERGIA SYMPATHETICA* Nimmo.

In the Calcutta Herbarium, *Wall. Cat.* 5848B. (from *Herb. Heyne*) is also this species.

14b. *DALBERGIA SUBSYMPATHETICA* Prain, *Journ. As. Soc. Beng.* lxi. 2. 116; scandent, leaflets 9-15, oblong truncate, thinly grey-pubescent beneath, flowers in small axillary panicles with dense corymbose branches, pod thin greenish oblong, 1-2-seeded not veined opposite the seeds, distinctly stalked. *Amerimnon subsympatheticum* Prain MSS.

PENANG; *Curtis*! PERAK, very common. SINGAPORE; *Hullett*!

Branches often twisted, the young ones finely grey-downy. *Leaves* 1.5-3 in. long; leaflets moderately firm; thinly adpressed-pubescent beneath. *Panicles* distinctly peduncled with finely pubescent ascending curved branches, the ultimate branchlets secund. *Calyx* $\frac{1}{2}$ in., pubescent, with 2 small obtuse bracteoles at base, teeth short obtuse except the lowest lanceolate. *Corolla* twice the calyx, petal-claws short, standard narrow, white. *Stamens* 9 monadelphous. *Ovary* glabrous except along the lower suture. *Pod* thin membranous greenish glabrous, 2.5 in. long, 1 in. wide, 1-seeded, slightly cuneate at base and distinctly stalked.

Very nearly related to *D. Junghuhuii* and only differing by its much smaller leaflets and rather longer flowers which are arranged in smaller more numerous panicles. Also exceedingly like *D. sympathetica* from which it differs in its glabrous ovary, distinctly stalked pods and usually fewer leaflets not silky beneath.

14c. *DALBERGIA MILLETTI* Benth. *Journ. Linn. Soc. iv. Suppl.* 34; scandent, leaflets 25-35, glabrous, crowded, linear-oblong obtuse or

retuse, flowers in distinctly peduncled axillary cymes with glabrous or minutely puberulous branches, pedicels very short, petal-claws shorter than calyx, ovary pilose, pod ovate-oblong, 1-seeded, indurated and rugose opposite the seed. *D. tamarindifolia* Roxb. *Flor. Ind.* iii. 233 in part; *Wight Ic. t.* 242 (as to the fruit). *D. polyphylla* Benth. *Pl. Jungh.* 256, in part. *Derris pinnata* Lour. *Fl. Cochinch.* 432 (possibly).

KHASIA; 2–4000 feet, *G. Mann*! at Shampung, *Collett*! at Maoksan-dram, *Clarke*! **DISTRIB.** China.

Branches sparsely clothed with fine brown pubescence. Leaves 3–6 in. long, leaflets a little like those of *D. tamarindifolia*, but usually rather shorter and always narrower besides differing in not being oblique. Cymes 1–2 in. long, slender. Flowers small hardly $\frac{1}{8}$ in. long. Pod 1.5–2 in. long, $\frac{3}{4}$ in. wide, “swelled, scabrous, where the single seed is lodged” (*Roxburgh*).

Mr. Kurz has already pointed out in the *Society's Journal* (vol. xlv. pt. 2, p. 281) that there is something seriously amiss in the identification of *D. rufa* Grah. and *D. multijuga* Grah. with *D. tamarindifolia* Roxb. That the flowers and foliage of *D. tamarindifolia*, as described by Roxburgh and as figured by him in the plate subsequently published in *Wight's Icones t.* 242, are those of *D. rufa* and of *D. multijuga* is certainly true. But the fruit described and figured by Roxburgh is, as Kurz was the first to remark, widely different. Mr. Kurz was apparently inclined to suppose that the Assam (or Sylhet) plant described by Roxburgh might have different fruit from that of the Burmese one. This supposition was only natural since a mixture of flowers of one species with fruit of another is an accident of which, such was his care and accuracy, there is hardly an instance in the whole of Roxburgh's work. The present is, however, such an instance. There are now at Calcutta examples of the pods of *D. tamarindifolia* from every locality between the Himalayas and the Malaya Archipelago and they never differ in any respect. Moreover, since Mr. Kurz wrote, both Mr. Mann and Genl. Collett have collected in the Khasia hills a plant that has a pod which accords exactly with Roxburgh's description and figure; this plant proves an analysis to be in all respects the same as the Chinese *D. Milletti*. Mr. Clarke too has collected specimens with the same pods; his plant only differs from Mann's and Collett's in having leaflets rather broader in proportion to their length. The figured pod in *Wight's* plate is, as in the original coloured drawing, shown detached. Probably what happened was that Roxburgh's living plants of *D. tamarindifolia* did not produce fruits in the Calcutta garden, and that one of the fruits sent by a correspondent from Silhet as those of *Ketee*, which is the vernacular name that Roxburgh quotes for *D. tamarindifolia*, was drawn along-side the figure made from a living plant. But the fruit so figured, instead of belonging to *D. tamarindifolia*, was that of the similar, but still very different, species just described.

It has been usual to quote *Derris pinnata* Lour. as the equivalent of *D. tamarindifolia*. The latest author to do this is Dr. Kuntze (*Rev. Gen. Pl.* i. 159) and on this assumption, for it is no more, he uses the specific name first used by Loureiro instead of that used by Roxburgh. This is but another instance of bibliographic alteration of name without reference to authentic specimens. Loureiro's plant had glabrous leaflets and therefore, unless it was misdescribed by Loureiro, an assumption that no one has the slightest right to make, it cannot be *D. tamarindifolia*. That it may be *D. Milletti* is not impossible, but so far no one has given such an account of the

root as might enable one to decide. The rediscovery of Loureiro's plant in Cochin China ought to be easy, but till it takes place the writer prefers to let *Derris pinnata* remain a doubtful species.*

15. *DALBERGIA TAMARINDIFOLIA* Roxb. *Hort. Beng.* 53.

This species is very common in the Andamans, in addition to the localities mentioned in the *F. B. I.*; it occurs even on outlying members of the group like Barren Island. The description in *Roxb. Flor. Ind.* iii. 233, as to leaves and flowers applies to this species; as to fruit it applies to *D. Millettii*.

15b. *DALBERGIA BURMANICA* Prain; a tree; leaflets 7-9, oblong-obtuse glabrous, flowers in congested sessile axillary panicles with corymbose branches, pedicels short, petal-claws as long as the calyx, pod unknown. *Amerimnon burmanicum* Prain MSS.

BURMA; Ruby Mines district, *King's Collectors*!

A tree 25 feet high or higher, young branches and leaves finely puberulous, soon glabrous. *Leaves* 4 in. long, leaflets moderately firm, 1.5-2 in. long, stipules small soon deciduous. *Panicles* sessile 1-2 in. long, the branches densely brown-pubescent; pedicels shorter than the calyx, the bracteoles at its base narrow lanceolate. *Calyx* $\frac{1}{2}$ in., pubescent, teeth short obtuse. *Corolla* purple, 2-3 times the length of calyx, blade of standard oblong. *Stamens* 9 monadelphous. *Ovules* 1-2.

A very distinct species with leaflets like those of *D. velutina* but glabrous and less numerous, and with small not large stipules; combined with this we have an inflorescence exactly like that of *D. tamarindifolia* and flowers only distinguishable

* In connection with this genus Kuntze allows his desire for "pure priority" to carry him away so completely that he would use the name *D. ferruginea* (Roxb. *Fl. Ind.* iii. 228) in place of *D. stipulacea* (Roxb. *Fl. Ind.* iii. 233), because it is given on an earlier page. *D. stipulacea* Roxb. being submerged, he is able to resuscitate the otherwise inadmissible *D. stipulata* (Wall. *Cat.* 5868) and to employ it instead of *D. velutina* (Benth. *Pl. Jungh.* 255) a name proposed by Bentham in order to obviate the trouble of having a "*stipulacea*" and a "*stipulata*" in the same genus. As Kuntze is at the same time replacing the name *Dalbergia* by the older but quite unfamiliar one *Amerimnon*, he thus affords himself an opportunity of upsetting all the old synonymy; *Dalbergia stipulacea* becomes *Amerimnon ferrugineum* Kuntze; our *D. velutina* becomes *A. stipulatum* Kuntze; our *D. tamarindifolia* becomes *A. pinnatum* Kuntze. Even if this were final it would be, in the writer's humble opinion, bibliography gone mad. But the worst of it is that it is anything but final. Kuntze's want of care in comparing the account that Loureiro gives of *Derris pinnata* has made him assume the responsibility of the name *Amerimnon pinnatum* as designating *Dalbergia tamarindifolia*. As *Derris pinnata* cannot, unless Loureiro blundered in his description—and this Kuntze has no right to assume—be *Dalbergia tamarindifolia* at all, Kuntze's name must be altered by the next bibliographic purist. More extraordinary still our bibliographer errs in his own particular province. The names *D. stipulacea* and *D. ferruginea* were not first published on pages 233 and 228 respectively of the third volume of Roxburgh's *Flora Indica*. They were issued first in the *Hortus Bengalensis*, *D. stipulacea* being published on p. 53 and *D. ferruginea* not till p. 98 of that work. So that after all, by Kuntze's own "rules," *D. stipulacea* is the prior name and the next "bibliographer" is recommended the happy task of undoing Kuntze's alterations.

from those of *D. tamarindifolia* in being purple, not white, and in having narrower and rather longer bracteoles under the calyx. From both *D. velutina* and *D. tamarindifolia* it differs in being a tree. Also like *D. lanceolaria* its leaves only begin to appear after flowering has commenced. The pod being unknown this may be a *Selenolobium*; more probably, however, it is a *Sissoa*.

17. DALBERGIA PURPUREA Wall.

Add to synonyms of *F. B. I.*:—*D. paniculata* Kurz, *Journ. As. Soc. Beng.* xlv. pt. 2. 279 and *For. Flor. Brit. Burm.* i. 345.

This, as Mr. Benthams and Mr. Baker have pointed out, is very nearly related to *D. lanceolaria*. Mr. Benthams in describing the plant suggests that it may be a climber; Mr. Baker in his description omits the doubt and speaks of it as scandent. It is, however, the tree known as *Tabou-ben* or *Ta-pouk-ben* in Pegu. The species is based on Wall. Cat. 5869, but under this number Dr. Wallich, as in many other instances, has in the hurry of distribution confused two very distinct species; the specimen of Wall. Cat. 5869 at Calcutta is the same as Wall. Cat. 5859, which is *Dalbergia cana* Grah. The effect of this mistake has been very far-reaching and has led to quite a number of misidentifications in Mr. Kurz's admirable *Forest Flora*, the most authoritative work on Burmese trees.

D. purpurea differs, as Mr. Benthams and Mr. Baker point out, from *D. lanceolaria*, of which it seems to be the representative in Burma, in having a calyx with shorter teeth and in having a rather shorter corolla. It differs besides in having no callosity on the standard. It appears further to form no new leaves till flowering is over; in *D. lanceolaria* the new leaves begin to show while flowering is still going on.

18. DALBERGIA VOLUBILIS Roxb.

This species is also very common in the Andamans; and all the specimens from the Western Ghats seen by the writer that profess to be *D. confertiflora* prove to be *D. volubilis*.

19. DALBERGIA ASSAMICA Benth.

This is, according to Mr. Peal, the tree known in Assam as *Medeloa*. Whether it is in no case a climber is not so clear as one would wish; there seems no foundation for the statement that it occurs in Kamaon. It is the Assamese representative of *D. lanceolaria* just as *D. purpurea* is the Burmese representative of that species.

20. DALBERGIA PANICULATA Roxb.

Add to synonyms of *F. B. I.*:—*D. nigrescens* Kurz, *Pegu Rep. App.* A 48 and *App.* B 45; *Journ. As. Soc. Beng.* xlv. pt. 2. 279.

Add to localities of *F. B. I.*:—BURMA; common everywhere from the Hukung Valley (*Griffith* n. 1810!) and Bhamo (*J. Anderson*!) to Pegu (*Kurz*!), the Karen Hills (*Eyre*!) and Shan Hills (*King's Collectors*!)

22. DALBERGIA HIRCINA Benth.

Add to synonyms of *F. B. I.*:—*D. robusta* Wall. Cat. 5849A (partly). *D. stenocarpa* Kurz, *Journ. As. Soc. Beng.* xlv. pt. 2. 205.

Dr. Wallich has apparently made an usually grave confusion in connection with this species and *D. lanceolaria*. Mr. Baker finds that in London the true *D. hircina* Ham. is represented by Wall. Cat. 5871B only, 5871A being *D. lanceolaria*. This is

also the case at Calcutta. But in London Mr. Baker finds that *D. robusta* Wall. (*Cat.* 5849A) is *D. lanceolaria*, whereas at Calcutta it is *D. hircina*. In neither case, however, is it Roxburgh's *D. robusta*; Dr. Roxburgh's species is a *Derris*.

23b. *DALBERGIA HEMSLEYI* Prain; a tree, leaflets 5-7 ovate-obtuse, ferrugineo-pubescent, flowers in peduncled axillary lax few-fl. panicles, pedicels longer than calyx, petal-claws medium, pod 1-3-seeded rather thickened and veined opposite the seeds. *Amerimnum Hemsleyi* Prain MSS.

BURMA; Shan Hills, at Fort Stedman, Collett 682! Myingyan, Prazer! Indine, King's Collector!

Branches pedicels and leaves especially on the underside at first densely clothed with dark-brown tomentum. Leaves 4 in. long, leaflets usually 5, 1.5 in. long, .75 in. wide, firm, dull beneath, stipules small deciduous. Panicle about as long as leaves, branches densely brown-pubescent spreading, each 3-4-fl., pedicels .25 in. Calyx $\frac{1}{2}$ in., lower tooth little exceeding the rest. Corolla twice the calyx. Pod 2.5-4 in. long, .8 in. wide, very like that of *D. lanceolaria*.

A very distinct species compared by Sir H. Collett and Mr. Hemsley with *D. Collettii*, but differing from that species in its larger flowers with 2-adelphous stamens and its rather larger and broader pods, also in its fewer leaflets with rusty-grey pubescence.

24. *DALBERGIA CANA* Grak.

This is described as a climber in the *F. B. I.* Mr. Kurz, who collected specimens that agree absolutely with Wall. *Cat.* 5859, has pointed out that it is a tree. The native name, Mr. Kurz notes on his specimens, is *Toun-kassoh*. The specimen of Wall. *Cat.* 5869 (which ought to be *D. purpurea*) that is preserved in Herb. Calcutta belongs to this species.

24b. *DALBERGIA KURZII* Prain; a tree; leaflets 15-19 abruptly bluntly acuminate, flowers in long axillary panicles with corymbose branchlets, pedicels ebracteate as long as the calyx, calyx-teeth shorter than the tube, pod flat firm oblong-oblancoolate, tapering to a pubescent stalk, elsewhere glabrous, brown, thickened and obscurely veined opposite the seed. *D. purpurea* Kurz, *Journ. As. Soc. Beng.* xlv. pt. 2. 279 (*excl. cit.* Wall. *Cat.* 5869); *For. Flor. Brit. Burm.* i. 344, not of Wall.

BURMA; Pegu, Maclelland (n. 8 in *Herb. Ind. Or. H. f. & T.*)! Brandis 1170! Kurz 1780! 1783! 2603! 2608! Kalay Hills, Prazer! Shan Hills, Alpin!

Branches, leaf-rachises and leaves beneath glabrous. Leaves 9-18 in. long, leaflets rigidly subcoriaceous 2-4 in. long, tapering to base, obovate abruptly bluntly acuminate rarely obtuse at tip, veinlets rather raised on lower surfaces. Panicles sparse appearing before the leaves, the branches finely brown-silky. Calyx purple, minutely puberulous, teeth lanceolate-deltoid. Corolla twice the calyx, white or pale-rose. Pod 3-3.5 in. long, 1.25 in. wide.

This plant is the *Thit-poh* of the Burmese, the *Dalbergia purpurea* of all Mr. Kurz's writings. From the description it will be particularly obvious that it is not at all nearly related to *D. lanceolaria* and therefore cannot be the *D. purpurea*

described by Mr. Benthham. The origin of the discrepancy lies in the Wallichian mixture of specimens referred to under *D. purpurea*,—the sheets examined by Mr. Benthham and Mr. Baker exhibiting a plant nearly related to *D. lanceolaria*, whereas the one examined by Mr. Kurz is *D. cana*, a species with flowers so like those of *D. Kurzii* that they are only to be distinguished by their purple instead of white petals. The writer was at first inclined to think indeed that *D. Kurzii* was no more than a variety of *D. cana*, the differences of foliage and especially of fruit appear however to be quite constant. Mr. Kurz seems to have been quite aware, as a reference to his note in *J. A. S. B.* xlv. 2. 279 shows, that Dr. Wallich had here two plants under one number, since he quotes Mr. Benthham's reference to *D. purpurea*, 'in part' only. But obviously, as Mr. Benthham had access to the type specimen of 5869, while Mr. Kurz had no more than a distributed one before him, it was to the plant described by Mr. Benthham and not to his own quite different one that Mr. Kurz should have confined the name *D. purpurea*. But Mr. Kurz had already obscured the issue by identifying the real *D. purpurea* with *D. paniculata*, an identification which led him further into giving a description of the true *D. paniculata* under the name *D. x. grescens*.

25. DALBERGIA STIPULACEA Roxb.

Mr. Baker describes this as 'scandent,' Dr. Roxburgh says it is 'shrubby.' Both descriptions are accurate; in open land or along streams it is a shrub or small bushy tree reaching 20 feet or more in height. In the interior of forests it is a fairly strong climber.

25b. DALBERGIA WATTII Clarke, *Journ. Linn. Soc.* xxv. 17. t. 5; a spreading tree; leaflets 9–11, glabrescent lanceolate-acute, flowers in small axillary panicles with racemose branches, pedicels longer than the calyx with conspicuous persistent bracts and bracteoles, calyx-teeth shorter than the tube, pod glabrous short-stalked veined opposite the seed. *Amerimnum Wattii Prain MSS.*

MANIPUR; Meitaphum, 5000 feet, Watt 6830! Mayung, 3500 feet, Clarke 42034!

Branches glabrous. Leaflets subopposite 2.5–3 in. long, slightly pilose beneath. Calyx puberulous $\frac{1}{2}$ in. Corolla twice as long as calyx, standard orbicular emarginate. Pod 2.25 in. long, .75 in. wide, 1-seeded.

A very distinct species closely related to *D. stipulacea* but without the marked thickening of pod opposite the seed and with very acute leaflets that are almost opposite.

25c. DALBERGIA OLIVERI Gamble MSS.; a tree; leaflets 10–15, oblong-obtuse emarginate (acute when young) glabrous, flowers in copious spreading terminal panicles with racemose pubescent branches, pedicels about as long as calyx with conspicuous bracts and ultimately deciduous bracteoles, calyx-teeth short, the two uppermost rounded, the rest acute, the lowest longest, all glabrous except the ciliate edges, pod 1–2-seeded narrowed at base into a slender stalk, acute at tip, prominently veined and thickened opposite the seed. *Amerimnum Oliveri Gamble MSS.*

UPPER BURMA; Wuntho and Bhamo, J. W. Oliver!

Branches glabrous; *leaves* 6-8 in. long, leaflets 1-1.5 in. long, .5 in. wide. *Calyx* $\frac{1}{8}$ in. *Corolla* 3-4 times as long as calyx, standard orbicular, .2 in. broad, wings as long as standard, keel much shorter. *Stamens* in 2 bundles of 5 each. *Ovary* falcate, pubescent below, ending in a curved style. *Pod* 3-4 in. long, .9-1.2 in. broad.

This is the *Tamalan*, a handsome tree with fine dark-red wood used for axe-handles, etc. The description is from a manuscript note by Mr. Gamble, accompanying specimens of the tree sent by him to *Herb. Calcutta* from the Imperial Forest School at Dehra Dun.

25d. DALBERGIA PRAZERI Prain; a tree; leaflets 15-17 obtuse, puberulous beneath, flowers in sparse axillary panicles, pedicels longer than the calyx, pod thin glabrous 1-3-seeded not much thickened opposite the seed.

BURMA; Koni, Prazer!

Branches glabrous. *Leaf-rachis* 6-8 in., leaflets moderately firm obtuse, 1-1.5 in. long, glabrous above, sparsely rusty-pubescent beneath and glaucescent. *Panicles* much shorter than the leaves with only a few lax branches, bracteoles, if any, deciduous. *Calyx* densely pubescent, lowest tooth linear exceeding the others. *Corolla* unknown. *Pod* thin, ovate-acute, 2-4 in. long, .75 in. wide, gradually narrowed into a stalk much longer than calyx.

Evidently exceedingly closely related to *D. stipulacea* from which, except for the sparse pubescence on the leaves beneath and the hirsute calyx it is hardly distinguishable in flower; the pods, however, are totally unlike and this renders the separation of the two forms absolutely necessary.

26. DALBERGIA TORTA Grah. in Wall. Cat. 5879.

Add to localities of *F. B. I.*:—BENGAL; Sundribans, very common, Clarke! Heinig!

This, being a much older name than the name *D. monosperma* Dalz., must be employed for the species.

Mr. Baker has defined § *Selenolobium* as having stamens in two bundles of 5 each thus implying that this is the case here. In *D. torta*, however, the stamens are, as Mr. Benth. has already described them, always monadelphous.

[29. DALBERGIA STENOCARPA Kurz.]

This is only *D. hircina* Ham., and must be deleted.

30. DALBERGIA PARVIFLORA Roxb. Hort. Beng. 98; scandent, leaflets glabrous 5-9, ovate-lanceolate with obtuse slightly emarginate tips, flowers very small in axillary and terminal panicles with corymbose branches, pedicels very short, pod turgid when young falcate along upper, when ripe convex along both sutures if 1-seeded, and if more than 1-seeded torulose between the seeds. *Flor. Ind.* iii. 225; *Miq. Flor. Ind. Bat.* i. 132; *Benth. in Journ. Linn. Soc. iv. Suppl.* 33; *Prain, Journ. As. Soc. Beng.* lxvi. 2. 121. *D. Cumingiana* Benth. Pl. Jungh. 225; *Journ. Linn. Soc. iv. Suppl.* 32; *Miq. Flor. Ind. Bat.* i. 129. *D. Zollingeriana* *Miq. Flor. Ind. Bat.* i. 130. *Drepanocarpus Cumingii* Kurz, *Journ. As. Soc. Beng.* xlv. pt. 2. 282.

ANDAMANS; *Helper* 1808! DINDINGS; *Curtis*! PAHANG; *Ridley*! PERAK; very common. DISTRIB. Malay Islands.

Stem 30–80 feet long, branches glabrous. *Leaflets* 2–3·5 in. long, '75–1·5. in. wide. *Calyx* $\frac{1}{2}$ in. campanulate, teeth obtuse, upper two connate, lower three subequal as long as tube. *Corolla* white $\frac{1}{4}$ in. long, claws of petals short. *Stamens* 10, monadelphous. *Pod* '75–2 in. long, '6 in. wide.

This is one at least of the plants yielding the *Kayu-lakka* of commerce.

31. *DALBERGIA MENOEIDES* *Prain, Journ. As. Soc. Beng.* lxvi. 2. 120; scandent, spineless, leaflets three, acute large, pod flat.

MALAY PENINSULA; Perak, *Scortechini* 1392!

A wide-twining shrub with twisting black branches. *Leaflets* usually 3, ovate-lanceolate, tapering to both ends, dark-green and glabrous above, sparsely adpressed-puberulous beneath, 3–3·5 in. long, 1–1·5 in. wide. *Flowers* very few sessile, clustered at the tips of short puberulous axillary peduncles. *Calyx* $\frac{1}{4}$ in. campanulate, teeth short subequal obtuse. *Corolla* more than twice as long as calyx. *Stamens* 10, monadelphous. *Pod* greenish semilunar flat glabrous firm, reticulated throughout, upper suture recurved; 1·5 in. long, '75 in. wide, 1-seeded; tip acute stalk rather longer than calyx.

A very distinct species.

32. *DALBERGIA KUNSTLERI* *Prain, Journ. As. Soc. Beng.* lxvi. 2. 121; scandent, spineless, leaflets 7–9 acuminate, coriaceous, glabrous, pod turgid.

MALAY PENINSULA; Perak, *Kunstler*!

An extensive climber 40–150 feet long, with puberulous branches. *Leaflets* dark-green above, dull-grey and when young densely pubescent beneath, elliptic-acuminate, 4–6 in. long, 2 in. wide, with very prominent midrib and secondary veins beneath. *Flowers* in axillary panicles, 4–6 in. long, with puberulous branches. *Calyx* $\frac{1}{4}$ in., teeth longer than tube. *Corolla* $\frac{1}{4}$ in., blue; standard orbicular. *Pod* finely puberulous, rigid, much thickened throughout, 1–2-seeded, 1·5–2·5 in. long, '9 in. wide, '3 in. thick, short-stalked, dark-brown, almost black when ripe but with grey lines along the sutures due to rupture of the epicarp.

A fine species very nearly related to *D. reniformis*, of which it has much the pods. These are, however, larger and thicker as also are the leaflets. The pod is quite indehiscent, but as it ripens the skin cracks along both sutures and a "grey seam" (to which *Kunstler* alludes in his field-note) is produced by the exposure of the suberous mesocarp along two lines parallel to each suture. Sometimes the pod consists of but one reniform segment; usually there are two, but the seed in the distal segment rarely matures and the epicarp consequently not giving way, there are usually no "seams" along the sutures of that segment.

87. PTEROCARPUS LINN.

1. *PTEROCARPUS INDICUS* *Willd. Sp. Pl.* iii. 904.

Delete from the synonyms of *F. B. I.*:—*P. dalbergioides* *Roxb. Flor. Ind.* iii. 236; also, *P. Wallichii* *W. & A. Prodr.* 267; also *P. indicus* *Bedd. Fl. Sylvat.* t. 23.

A very strange error has found its way into some of our most authoritative works

on Indian vegetation in the statement that *P. indicus*, even in the sense that makes the species include *P. dalbergioides*, is a native of India. Wight and Arnott, extremely careful and accurate authors, who have not confounded *P. indicus* with *P. dalbergioides*, are at pains, in describing *P. dalbergioides*, to say of it "Our specimens are from the Madras Herbarium and were perhaps from the Missionaries' garden." And Col. Beddome in figuring *P. dalbergioides*, which he does under the belief that he is figuring *P. indicus*, says of it "a very handsome tree said to be indigenous in Southern India, but I have never met with it wild." Even as a cultivated tree, *P. indicus* proper is so rare in India as to be practically unknown. When it is planted it goes as a rule under the name *P. sazatitis*, and is not usually supposed, even by botanists, to be the same as *P. dalbergioides* which has appropriated the name *P. indicus* though it has no special claim to it. The only distributed "Indian" examples of true *P. indicus* (except those grown in the Calcutta garden), that the writer has seen, are from the herbarium of K. S. Naidoo, who was formerly in Dr. Wight's service, and from Dr. Wight's own Herbarium (K. D. 809); curiously, Naidoo has labelled his specimens "Andaman red-wood tree" which is precisely what *P. indicus* is not. The diagnosis between the two trees so often confounded is as follows:—

Leaflets finely-veined throughout, pedicels longer than the calyx,	
beak of pod distinctly raised above the outer base...	... <i>P. indicus</i> .
Leaflets with 5-7 pairs of distinctly raised veins beneath, pedicels	
shorter than the calyx, beak of pod not raised above the outer	
base ... ..	... <i>P. dalbergioides</i> .

The distribution of *P. indicus*, as shown by specimens of the plant preserved in Herb. Calcutta is as follows:—

TENASSERIM; Moulmein, *Falconer!* *Brandis!* Amherst, *Falconer!* Tavoy, *King's Collector!* MALAYA; Penang, *Wallich*, 5843 G. (*erroneously named P. dalbergioides!*) Malacca, *Griffith!* *Maingay* 550! Perak, *Kunstler* 1513! 8713! *Scortechini* 503! *Wray* 2003! 2280! Sumatra, *Teysmann!* Java, *Horsfield!* *Koorders and Valetton!*

There are also specimens, from *planted* examples only, from Rangoon, but the tree seems as thoroughly a stranger in Burma, *north of Martaban*, as it is in India. Mr. Kurz does indeed say that it is "very rare along the eastern slopes of the Pegu Yomah;" neither he, nor any one else, has ever communicated any specimens from there.

Some vague opinions have been held regarding this tree, as to points other than its geographical distribution. Thus it has been usual to say that *Pterocarpus flavus* Lour. is probably the same species. It is exceedingly difficult to understand why, for when one consults Loureiro one finds that he bases his species on a picture given by Rumphius of the *Kayu Malapari* of the Malays, the fruit of which Rumphius does not figure, and on another tree of which Loureiro knew the fruit but did not know the flowers. Moreover the description that Rumphius gives of the fruit of his tree does not even remotely agree with the description given by Loureiro. When one takes the trouble to look at Rumphius' figure and to read his description, one finds that his *Malaparius* has *opposite leaflets* and a *wingless pod*, and learns in fact that Rumphius' account of *Malaparius* is an excellent and un-

mistakable description of *Pongamia glabra*, one of the most familiar of trees to those who have collected on the coasts of Burma, the Andamans, or Malaya. *Pterocarpus obtusatus* Miq. has no foundation; it can be manufactured if one is careful to collect only the leaves toward the bases of branches; and *P. Zollingeri* Miq. is only *P. indicus* with its fruits collected at a particular stage of their development.

P. Wallichii W. & A., reduced to *P. indicus* by Mr. Bentham and also by Mr. Baker, is based on *Wall. Cat.* 5843D. which is not represented at Calcutta. There is at Calcutta, however, an example of *P. Wallichii*, named by Dr. Wight himself, collected in Western India by Stocks. This plant is not *P. indicus* at all, but comes nearer that variety of *P. Marsupium* (with less obtuse leaves and a broader pod) approaching *P. indicus*, which is mentioned by Mr. Bentham in *Journ. Linn. Soc. iv. Suppl.* 77.

P. dalbergioides Roxb. (the Andaman red-wood) is strictly confined, in a wild state, to the Andaman Group. It is now, however, frequently planted in India.

2. PTEROCARPUS MACROCARPUS Kurz.

It must be by a mere *lapsus calami* that Mr. Kurz has stated in his *Forest Flora* that this is frequent in Martaban and Tenasserim, for neither he nor any other botanist has reported it from Tenasserim, and he has himself only once collected the species in Martaban. The tree is very widely distributed in Burma, where it is known as *Padouk*, a name that has however been applied in Tenasserim to *P. indicus* also, and by Burmese convicts at Port Blair to the Andaman Red-wood (*P. dalbergioides*) as well. The localities, as shown by specimens in *Herb. Calcutta*, are as follows:—

MARTABAN; Kurz! PEGU; Tonkyeghat, Kurz! Eyre! Brandis! Sir D. Brandis' specimens has been named *P. indicus* by Mr. Kurz and form the basis of his remark (*For. Flora Brit. Burm.* i. 349) that *P. indicus* occurs in Pegu). UPPER BURMA; Karen Hills, Brandis 1159! Shan Hills, King's Collectors! at Kyonkse, Kyonkmyoung and elsewhere, common, King's Collectors! Chin Hills, King's Collectors!

4. PTEROCARPUS MARSUPIUM Roxb.

VAR. *typica*, leaflets oblong-obtuse. *P. Marsupium* Roxb. *Cor. Pl.* ii. t. 116.

SOUTHERN INDIA and CEYLON.

VAR. *acuminata*; leaflets ovate cuspidate-acuminate, pods much larger than in type. *P. Wallichii* W. & A. *Prodr.* 267?

BEHAR; Rajmahal Hills near Sahibganj, Kurz! DECCAN; Naudoshi, Tilak! RAJPUTANA; Abu, Stocks n. 237! CONCAN; Gujeh jungles, Ritchie! Canara, Yellapur, Talbot!

The flowers of this variety are not distinguishable from those of *P. Marsupium*, the pod however is somewhat different and most probably the plant is quite worthy of specific rank. It is often issued from herbaria as *P. indicus* which it does not, either as to the flowers, fruit, or texture of leaves, in the least resemble. Without having an opportunity of examining *Wall. Cat.* 5843D, on which "*P. Wallichii*" is based, the writer cannot venture to say if Stocks' plant, so named by Wight, be the same. For this reason the name "*acuminata*" rather than the name "*Wallichii*" has, for the present, been given to the variety.

Pterocarpus floribundus Wall. *Cat.* 5846, a species to which neither Mr. Bentham nor Mr. Baker allude, is a *Derris* (§ *Aganôpe*).

88. PONGAMIA VENT.

PONGAMIA GLABRA Vent.

VAR. *typica*; leaflets usually 5, occasionally 7, oblong or ovate, 2·5-3·5 in. wide, quite glabrous beneath; racemes always solitary simple, pedicels ·35 in. long, their bracteoles only subopposed and situated slightly above the middle. (Synonyms as in *F. B. I.* with in addition *P. grandifolia* Zoll. & Mor. *Syst. Verzeich.* 3; *Miq. Flor. Ind. Bat.* i. 147. *P. mitis* Kurz, *Journ. As. Soc. Beng.* xlv. 2. 128.—*Rumph. Herb. Amboin.* iii. t. 117.—*Lamk. Ill.* t. 603 (Pungamia).

SEA-COASTS; Banks of Tidal rivers and mangrove swamps on all the coasts: only occurs inland as a planted species.

VAR. *xerocarpa*; leaflets 7-9, very rarely 5, lanceolate, 1-1·35 in. wide, usually sparingly puberulous on the midrib and main-nerves beneath, racemes occasionally 2-3 in. an axil, sometimes sparingly branched, pedicels ·25 in. long the bracteoles opposed and placed close under calyx. *P. xerocarpa* Hassk. *Retz.*, ed. nov., 208.

CEYLON; *Thwaites* 1489! PAHANG; *Ridley*! KEDAH; *Kunstler*! PERAK; *Kunstler*! MALACCA; *Derry*! DISTRIB.; Java.

This well known littoral species is the *Pangam* of the Tamils, the *Karanj* of Hindustan, the *Thin-win* of the Burmese, the *Malapari* of the Malays.

It never climbs and only occurs inland as a planted tree on roadsides or in village groves; its timber is in use for making oil-mills in Northern India, solid cart-wheels in Southern India. The seeds yield the well-known "*Karanj-oil*," which is burned and is also used in skin complaints.

The typical variety occurs in two rather distinct forms that pass into each other, however, by all sorts of intermediates. These are:—1, a form with medium-sized leaflets and flowers (the original *P. glabra*) found everywhere; and 2, a form with decidedly larger leaflets and flowers (*P. grandifolia* Zoll. & Mor.) that, beginning in Chittagong, passes southwards through Arracan, the Andamans, the Nicobars, and Sumatra to Java, being evidently the most usual form along the whole line of distribution indicated; it nevertheless seems neither to extend westward to the Sundri-buns and India, nor eastwards to Tenasserim and the Malay Peninsula.

The plant here treated as VAR. *xerocarpa* was treated as a species by Hasskarl; an authentic example of his plant is preserved in Herb. Calcutta. The diagnosis now given shows that the characters which separate it from the type are individually trivial; yet it is, in general appearance, so unlike the type that there is some difficulty at first in believing them to be conspecific. On the other hand, this particular variety so closely resembles a species described as *Millettia decipiens* by the writer, and another described as *Pongamia dehiscens* (which is however also a *Millettia*) by Koorders and Valetton, that when no more than flowers are available it requires a careful examination of the ovary, (4-5-ovuled in the *Millettias*, only 2-ovuled in the *Pongamia*) to ensure accurate diagnosis. The fruits of the *Pongamia* are, however, exceedingly unlike the pods of the *Millettias*.

The name of this genus has been much debated. The question has been whether the name *Pongam*, proposed in 1763 by Adanson, modified by Lamarek in 1797 into *Pungamia*, and finally corrected by Ventenat in 1803 into *Pongamia*, is or is

not to be employed instead of the name *Galedupa*, used by Lamarck in 1786, and though spontaneously abandoned by that author in 1797, readopted by Roxburgh in 1814.

The name *Galedupa*, if we quibble over refinements of spelling, does indeed antedate the name *Pongamia* by 17 years and so cautious an authority as Taubert in the *Natürlichen Pflanzenfamilien* has recently followed Roxburgh's usage and readopted Lamarck's earlier name, thus abandoning the name familiarised by the usage of authorities like De Candolle, Bentham, Hooker, Wight, Kurz, Baillon and a host of others.

The usage readopted by Taubert appears to the writer to be highly inadvisable (1.) because the more familiar name (in the form *Pongam* at all events) long antedates the name *Galedupa*; and (2.) because the use of the name *Galedupa* at all was based on the identification of *Caju Galedupa* Rumphius (*Herb. Amboin.* ii. t. 13) with *Pongamia glabra*. This is so manifestly an impossible identification that one marvels at its ever having been suggested; *Caju Galedupa*, which is a *Sindora*, is figured as having equally-pinnate leaves, dehiscent pods, and an arillate funiculus, whereas in *Pongamia glabra* the leaves are unequally pinnate, the pods indehiscent, the seeds not arillate and with a small hilum. Moreover Rumphius knew and figured (*Herb. Amboin.* iii. t. 117) *Pongamia glabra* itself, under its Malay name *Malapari*. That Lamarck had detected his mistake before it was formally pointed out in 1803 by Ventenat, is abundantly clear from his having in 1797 (*Illustr.* t. 603) substituted the name *Pungamia* for the *Encyclopædia* name *Galedupa* of 1786.

These being the facts of the case it disconcerts one to find that Kuntze desires to deliberately revert to Lamarck's error; not only so, he proposes to employ a modified form of Rumphius' term *Caju* (*m*),—which is precisely the synonym that cannot possibly belong to the plant described by Lamarck—as the name of the plant to which Lamarck's definition applies. Perversity in bibliography could scarcely exceed this; nor perhaps could perversity in mere nomenclature. The Latin word *Arbor* is, it has been tacitly admitted, *tabued* as a generic name; it seems hardly fair that, even under the ægis of Kuntze's authority, its Malay equivalent,—erroneously transliterated, it is true—should be permitted to assert itself.

The *Malapari* of the *Herb. Amboin.* was referred by Loureiro, in opposition altogether to Rumphius' description of the pod, and in spite of his having figured the leaflets as opposite, to the genus *Pterocarpus*. Miquel (*Flor. Ind. Bat.* i. 1082 *addend.*) was the first to remove it from *Pterocarpus*; Miquel gave it generic rank, associating with it a plant collected by Teysmann in Sumatra; this plant is unfortunately not represented in *Herb. Calcutta*. In the *Genera Plantarum* (i. 465) the possibility is suggested that Rumphius' and Teysmann's plant may be specifically distinct; there is, however, nothing in Miquel's brief description to favour this suggestion; on the contrary it seems clear that the '*Malapari*' collected by Teysmann in Sumatra is *Pongamia glabra* just as the '*Malapari*' described by Rumphius from Amboina and the '*Malapari*' recently collected by Derry in Malacca both most certainly belong to it. It is, however, to be noted that while Rumphius' figure clearly indicates the typical plant, Derry's plant belongs to *VAR. ærocarpa* as, from the description of the pubescent petiolules, evidently does Teysmann's.

89. DERRIS LOUR.

[The name *Derris* was proposed in 1790 for a genus that had already in 1775 been named *Deguetia*.]

1. *DERRIS SCANDENS Benth.*

Add to localities of *F. B. I.*:—ANDAMANS; very common. NICOBARS; frequent.

3. *DERRIS ROBUSTA Benth.*

Add to localities of *F. B. I.*:—CHITTAGONG; very common. PEGU; Kurz! Brandis! *DISTRIB.* South-West Yunnan (*J. Anderson!*)

This is the well-known "*Korai*" of Assam and Silhet. Mr. Ellis gives the name "*Junguria*" as used in Chittagong, and Mr. Kurz notes the Burmese name as "*Tepu-kan*."

4. *DERRIS DALBERGIOIDES Bak.*

This tree is also very plentiful in Perak. In Malacca it has, according to Mr. Derry, two local names, "*Assam hutan*" and *Pokó Pêtei bilalang*."

5. *DERRIS ULIGINOSA Benth.*

As *Cat. n. 5879* this was distributed by Dr. Wallich under the name *Pongamia uliginosa*. Under one of the letters, however, (*Cat. n. 5879 E.*) he issued a very different plant which in *Pl. Junghuhn. 252 (adnot.)* Mr. Benth. treated as the type of a distinct species (*D. affinis Bth.*); this plant, at a later date, Mr. Benth. identified with *D. trifoliata* Lour. and reduced to *D. uliginosa* as a variety (*Journ. Linn. Soc. iv. Suppl. 108*). The acceptance of the latter view should obviously have involved the substitution of the name *D. trifoliata* Lour., which dates from 1790, for the name *Derris uliginosa* Bth. which is based on *Robinia uliginosa* Roxb. (in *Willd. Sp. Pl. iii. 1135*) dating only from 1800. Fortunately, however, the rule was in this case neglected.

The statement that the pod of *D. uliginosa* may be 2-seeded is not borne out by specimens reported to Calcutta. The writer has examined 137 fruiting herbarium specimens as well as numberless living plants, and has never found a pod of *D. uliginosa* with more than one seed. He has seen specimens from the Khasia Hills, named *D. uliginosa*, that have 2-seeded pods, but these have always been specimens of another species. The present species is a purely littoral one, met with, as Roxburgh says, "on wet banks of rivers, nullas, etc." (he might have added tidal rivers for it never occurs away from the influence of the tide), or as Wight and Arnott remark in "swampy places near the sea." For Mr. Benth. statement that it extends "over the plains of Central India, to Khasiya" and for Mr. Baker's "Eastern Himalaya" locality there is no foundation.

That *Derris trifoliata* Lour. cannot possibly be any form of *D. uliginosa* is quite clear from Loureiro's description; *D. trifoliata* has 2-3-seeded pods and white flowers, whereas *D. uliginosa* has only 1-seeded pods and has pink flowers. Besides, the racemes of *D. trifoliata* are described as "long" which is precisely what those of *D. uliginosa* are not. M. De Candolle, too, who saw Loureiro's specimens (see *Prodr. ii. 415*) did not identify them with Roxburgh's plant which he also had seen (see *Prodr. ii. 416*).

Whatever the relationship of *D. trifoliata* and *D. uliginosa* may be, it is absolutely certain that *Wall. Cat. 5879 E.* does not belong to *D. uliginosa*; its long panicles with smaller flowers and its more numerous prominent lateral nerves that run to the edge of the blade make it very different from *D. uliginosa*, the leaves of which have faint lateral nerves, hardly stronger than the secondary venation, that loop at their ends some way within the margin.

6. *DERRIS VESTITA* Bak.7. *DERRIS ELEGANS* Benth.

The large suites of Malayan specimens collected by Kunstler, large suites from the Andamans sent by Man, and large suites of Tenasserim specimens collected by Falconer and more recently by Proudlock, make it necessary to treat *D. vestita* as only a form of *D. elegans*.

Both *D. vestita* and *D. elegans* are reported in every case as having 'white' flowers. Father Scortechini was of opinion that his specimens must belong to a distinct species since, though they otherwise agreed with the *F. B. I.* description of *D. vestita*, they had differently coloured flowers.

The typical form of the species occurs in Perak and in Sumatra as well as in Martaban and Tenasserim. An unnamed sheet of Dr. Wallich's, (*Wall. Cat.* 7540) from Moulmein, belongs to the species. The form named *D. vestita* by Mr. Baker occurs in Perak as well as in Malacca and has been collected in Tenasserim, at Moulmein, both by Dr. Falconer and by Mr. Kurz.

10. *DERRIS CUNEIFOLIA* Benth.

This extends to Chittagong and Burma; the form, however, which occurs in Malaya, though united to the type by Mr. Baker, was distinguished by Mr. Benthams as a variety "*malaccensis*." Since Mr. Baker's account of the genus appeared, large suites, including many specimens with ripe fruit, have been sent from Perak; these show that it is better to separate the Malayan plant as a species. Incidentally too these suites of specimens seem to indicate that *Derris discolor* Bth. is only *D. cuneifolia* with ripe fruit; the writer has not, however, yet seen this directly demonstrated by suites of specimens from Sikkim or Silhet, where *Derris discolor* was found. *Amerimnum obovatum* Ham. which is the basis of *Pongamia obovata* Grah., as represented in Herb. Calcutta, belongs to this species.

10b. *DERRIS MALACCENSIS* Prain, *Journ. As. Soc. Beng.* lxi. 2. 107; leaflets 5-7, rather large, elliptic, abruptly long-acuminate, subcoriaceous, racemes shorter than the leaves, standard glabrous, pod winged or wingless when ripe. *Deguelia malaccensis* Prain MSS.

VAR. *typica*; pod distinctly winged, (as in a true *Derris*) along one or both sutures. *Derris cuneifolia* Bth. var. *malaccensis* Bth. *Journ. Linn. Soc.* iv. Suppl. 112.

TENASSERIM; Moulmein, Falconer! PERAK; Scortechini 110! Kunstler 4028! 4149! 4504! 8551! PENANG; Curtis 2735! MALACCA; Griffith! SINGAPORE; Ridley! DISTRIB. Borneo.

VAR. ? *aptera*; pod quite wingless when ripe (as in *Pongamia*).

MALACCA; Maingay, 613! PERAK; Kunstler, 4518! 6428! There are also specimens from Perak (Kunstler 3190! Wray 2025!) almost exactly intermediate, as to fruit, between typical *D. malaccensis* and the variety *aptera*.

VAR. ? *millettiodes*; pod as in var. ? *aptera*, but dehiscing when ripe (as in *Millettia*). PERAK; Kunstler 10696!

A climber 40-60 feet long, leaflets in all respects like those of *D. cuneifolia* except in their larger size and their long caudate-acuminate tips. Flowers as in *D.*

cuneifolia but pale yellowish-pink and larger (.65 in. long); ovules 4 (rarely 5). *Pod* larger; in the typical form distinctly winged down both sutures, in both varieties wingless. Possibly both varieties may prove specifically distinct.

The species seems intermediate between *D. cuneifolia* which has 2 (rarely 3) ovules, and *D. montana* Bth. from Java which has "about 8 ovules," and has leaves like those of *D. malaccensis*.

11. *DERRIS MICROPTERA Benth.*

This is described by Mr. Benthham and accepted by Mr. Baker as having a 2-callose standard. In Herb. Calcutta all the specimens with a 2-callose standard are easily referable to *D. cuneifolia*, whereas all those that agree with fruiting specimens of *D. microptera* have the standard ecallose. But the fruits of *D. microptera* are decidedly dehiscent, so that the species might be placed in *Millettia* to which genus indeed Mr. Gamble, Dr. King and Mr. Clarke have in the field referred specimens of the plant collected by themselves.

The species extends from Sikkim to the Khasia Hills where it has been collected by Griffith, by Oldham and by Clarke. The most marked feature of the species is its horse-shoe shaped seeds.

12. *DERRIS ELLIPTICA Benth.*

Add to localities of *F. B. I.*:—CHITTAGONG; *King's Collector!*

To this species belong the Malayan specimens of "*Millettia pachycarpa*" mentioned in *F. B. I.* ii. 106. It is not the only *Derris* with silky petals, *Derris eulata* Bedd. shows the same character though it does not have it so well marked.

13b. *DERRIS ANDAMANICA Prain, Journ. As. Soc. Beng.* lxvi. 2. 104; leaflets 7-9, oblong, rather large, acute, racemes copiously paniced, with pubescent branches, pedicels twice as long as the calyx, corolla large, pod finely permanently silky, wings along both sutures subequal.

ANDAMANS; Coco Group, *Prain!* S. Andaman, *King's Collectors!* NICOBARS; *King's Collectors!*

A large creeper, with pale golden-brown-silky branches. *Leaflets* subcoriaceous glabrous, 4-6 in. long, 2-3 in. wide, veinlets distinct. *Flowers* in axillary panicles 6-18 in. long, pedicels .3 in. long, fascicled or in racemes on produced nodes. *Calyx* finely golden-brown-silky .15 in. *Corolla* white, .6 in. long, standard not callose. *Pod* ligulate thin, 3-4 in. long by 1 in. wide, 2-3-seeded, each wing .12 in. wide.

Nearest *D. eulata* but very distinct by its glabrous petals and its silky pod.

14. *DERRIS EULATA Bedd.*

A species of this genus issued as *Dalbergia* sp. by Dr. Wallich (*Cat.* 5977) but not accounted for by Mr. Benthham or in the *F. B. I.* is the same as a plant collected by Col. Beddome at Nediwattam in 1881, and at the same place by Mr. Gamble in 1889; the same plant was also collected by Col. Beddome in the Tinivelly hills. The plant agrees well with Col. Beddome's and Mr. Baker's descriptions but it has silky petals; it may be this species, at all events it is none of the others described in the *F. B. I.*

15. *DERRIS HEYNEANA Benth.*

The limits of this species stand in need of definition. It is based on *Wall. Cat.* 5916 which is, unfortunately, not represented in the Calcutta collection.

Mr. Benthams identified with *Wall. Cat.* 5916 the plant issued as *D. paniculata* Wight (Herb. 920) and separated two varieties "*β. parviflora*" and "*γ? brevipes*." Mr. Baker has ascertained, however, that "*γ? brevipes*" is specifically distinct, and as regards the other two he reverses Mr. Benthams's judgment. He says that *Wall. Cat.* 5916 is not the same as Wight n. 920. which he makes a variety, while he gives the Concan plant, (Benthams's *VAR. β. parviflora*) as the equivalent of the type specimen. The point is of considerable importance because the two are very distinct; the Concan plant has a silky keel, the *D. paniculata* of Wight has all the petals glabrous; the two must be recognised as different species. What makes it most difficult to deal with the question in that Wight n. 920 is described by Mr. Baker as having considerably smaller leaflets than *Wall. Cat.* 5916. Its leaflets are, however, in reality much longer than those of the Concan plant referred to, or than those of the apparently closely related *D. eulata*. There is at Calcutta a specimen named "*D. Heyneana VAR. brevipes*" (*Herb. Ind. Or. H. f. & T. n. 10*) but it is exactly the same as the *D. Heyneana* of Dalzell and Gibson's *Bombay Flora* of which there is an authentic specimen at Calcutta—in any case it cannot be *D. brevipes* Baker because its pedicels exceed the calyx and its pods are quite glabrous. Members of the Society who live in Southern and Western India should endeavour to remove the difficulties that are connected with the differentiation of the species of this group.

16. DERRIS MARGINATA Benth.

Add to localities of *F. B. I.*:—CHITTAGONG; Helingomara and Demagiri, *Lister!* PEGU; *Brandis!*

16b. DERRIS AFFINIS Benth. *Pl. Jungh.* 252; leaflets 5, medium, firmly papery, ovate-acute, racemes laxly paniced, with sparsely adpressed-puberulous branches, corolla small. *Derris uliginosa VAR. Loureirii Benth.* in *Journ. Linn. Soc. iv. Suppl.* 108, in part. *Pongamia uliginosa Wall. Cat.* 5879 (*E only*) not of *DC.*

PENANG; *Wallich!*

A climber with pale-brown lenticular glabrous branches. *Leaves* 6 in. long, leaflets 2·5 in. long, 1·25 in. wide, lateral nerves 10 pairs prominent spreading, running almost to margin of leaf-blade. *Racemes* 6-8 in. long, their branches 2·5 in., spreading, nodes not produced. *Pedicels* filiform, 2 in. long, bibracteolate close under the calyx. *Calyx* campanulate, 12 in. long, subglabrous. *Corolla* 35 in. long, standard orbicular ecallose. *Ovary* sparsely hairy; ovules 4.

This is evidently very near to *D. marginata* and *D. amoena*; from the former it differs in having shorter pedicels bracteolate at their tips and in having more numerous prominent nerves to the leaves; from the latter it differs in having thinner pale leaves, and laxer panicles with spreading branches and more scattered flowers.

16c. DERRIS FLORIBUNDA Benth. *Journ. Linn. Soc. iv. Suppl.* 105; leaflets 3-5, medium, coriaceous, elliptic-oblong, racemes laxly paniced, with sparsely spreading puberulous pedicels, corolla small. *Brachypterum floribundum Mig. Flor. Ind. Bat. i.* 139.

PERAK; *Scortechini* 2180! *DISTRIB.* Java.

A stout rambling shrub with glabrous whitish branches. *Leaves* pale-green, 4-5 in. long, leaflets 2-2·5 in. long, 1-1·25 in. wide, with rounded base and obtusely acuminate apex, lateral nerves 4 pairs, faint below, invisible above. *Racemes* 1-1·5 feet

long, branches 4-6 in., spreading, pedicels ¼ in. 2-bracteolate close under the calyx. *Calyx* campanulate, purple-brown, ½ in. long. *Corolla* white, standard orbicular ecallose, with a green spot at the top of the claw. *Ovary* sparsely puberulous; ovules 4.

This may, as Prof. Miquel thought, be a *Brachypterum*; it seems, however, on the whole to be more nearly allied to *D. affinis*, *D. amoena* and *D. marginata*, the two last of which are certainly members of the section *Dipteroderris*. Unfortunately the pod is still unknown.

19. DERRIS MAINGAYANA *Bak.*

In consequence of the communication of intermediate forms it seems advisable to treat this as only a variety of *D. amoena*.

21. DERRIS CANARENSIS *Bak.*

The authentic specimens of *Brachypterum canarense* at Calcutta cannot be separated by the writer from the Concan specimens collected by Stocks and included by Mr. Benthams in *D. oblonga* Bth. The fruits of the Concan and the Ceylon plants placed under *D. oblonga* may differ; unfortunately our Calcutta specimens of *D. oblonga* from Ceylon are in flower only.

22. DERRIS SINUATA *Thw.*

Add to localities of *F. B. I.*:—BENGAL; Sundribuns, very common. PERAK; *Kunstler*! *Scortechini*!

23. DERRIS THYRSIFLORA *Benth.*

Delete from localities of *F. B. I.*:—"EASTERN HIMALAYA and the KHASIA MTS."

The species has never been reported to Herb. Calcutta from any locality north of Kedah on the mainland; it is found also in the Nicobars. Perhaps the Himalayan plant associated with this one is the next species, which though nearly allied is very distinct; the only circumstance that makes this conclusion doubtful is that the Himalayan plant in question is Dr. Wallich's *Pterocarpus floribunda*, a species that neither Mr. Benthams nor Mr. Baker have accounted for, and one that is retained as a *Pterocarpus* in the *Index Kewensis*.

Mr. Baker cites *Amerimnum obovatum* Ham. MSS. as a synonym of this species. But the only specimen in Herb. Calcutta which Dr. Buchanan-Hamilton has, in his own handwriting, named *Amerimnum obovatum* is a specimen which Prof. Graham has, also with his own hand, named "*Pongamia? obovata*"; it constitutes Wall. Cat. 5897 and is, as Mr. Baker elsewhere says, only *Derris cuneifolia*. And Wall. Cat. 9054, which Mr. Baker likewise quotes as being *Derris thyrsiflora*, it is better in the meantime to omit. The plant so numbered is not represented at Calcutta; at Kew there are apparently two very distinct plants under the number because Mr. Baker has referred Wall. Cat. 9054 to *Spatholobus acuminatus* as well as to *Derris thyrsiflora*.

23b. DERRIS WALLICHII *Prain, Journ. As. Soc. Beng.* lxi. 2. 99; leaflets acute two and half times as long as broad, pedicels as long as or longer than the calyx, pod broad not sinuate, distinctly winged down both sutures. *Pterocarpus floribundus* Wall. Cat. 5846.

SILHET; Wallich 5846! CACHAR; Prazer! KHASIA; Griffith 1770 [Kew Dist.]! Calcutta Collectors! at Mamloo, Clarke 43825! ASSAM; King's Collectors! ANDAMANS; King's Collectors!

Very similar to *D. thyrsiflora* but easily distinguished by the florets with pedicels 2-3 in. long, instead of sessile, and by the broader pods, 1.5-4.5 in. long, 1.5 across, with 1-2 seeds.

The Andamans specimens have rather thicker leaves than the Assam ones, and in this resemble *D. thyrsiflora*, but the more numerous nerves to the leaves and the pedicelled florets and buds readily distinguish the plant. The Griffithian specimens have been issued as *D. thyrsiflora*, those of Mr. Clarke as *D. marginata*, those of Dr. Wallich as *Pterocarpus floribundus*. It has been impossible to employ the specific name "*floribunda*," however, as there are already both an *Aganope floribunda* and a *Brachypterum floribundum* in the genus *Derris*.

DOUBTFUL SPECIES.

DERRIS ACUMINATA Benth.

This includes *Wall. Cat.* 5886 and *Wall. Cat.* 5901; the former at Calcutta is represented by two specimens and their flowers have a callose standard; they are in fact simply *D. cuneifolia* Bth. *Wall. Cat.* 5901 is unrepresented at Calcutta, but the plant collected by Sir J. D. Hooker in Sikkim is here. It is the same as *D. microptera* Bth. or, to be more precise, it is the flowering part of the plant whose fruits are described by Mr. Benthham as those of *D. microptera*. What the plant with 2-callose standard described as *D. microptera* may be the writer cannot say, there being no authentic specimen here. But of the two very similar species that have been reported from Sikkim, that with long cuspidate leaves and with most of its nodes unproduced never has callosities on the vexillum, the one with its nodes all produced and with leaflets that are either obtuse or if acute are not cuspidate always has callosities. In any case the pod of the plant termed *Derris microptera* is dehiscent as in *Millettia*.

DERRIS SECUNDA Bak.

This is based on *Wall. Cat.* 5890 which unfortunately is not at Calcutta. But a plant that exactly agrees with Mr. Baker's very clear description has been collected in the following localities:—

DAFLA HILLS; Toruputu, 7400 feet, *Lister*! KHASIA HILLS; 5-6000 feet, *G. Mann*, 199! *Badgeley*! BURMA; Nattoung Mts., *Kurz*.

To Mr. Baker's description it may be added that the leaflets are as often 9 as 7 and that in one specimen there are 11. The pods, collected by Capt. Badgeley, are thin strap-shaped 3-4 in. long, .8 in. wide, distinctly winged down the upper, very narrowly down the lower suture; seeds 2-3. This, as has already been remarked, is the plant described by Mr. Kurz as *Millettia monticola* which thus proves to be a *Derris* and must in all probability take the name *Derris secunda*.

DERRIS POLYSTACHYA Benth.

Add to description of *F. B. I.*:—*Pod* thin flat ligulate-oblong, glabrous, flexible, finely veined, 3-4 in. long, 1.25-1.5 in. wide, the upper wing .25 in. wide, the lower narrower.

Add to localities:—BOORAN; *King's Collectors*! SIKKIM; *J. Anderson*! *King*! *Gamble*!

The pod is very like that of *D. marginata* to which it is closely allied, but is not so pale in colour; this now ceases to be a doubtful species.

DERRIS OVALIFOLIA Benth.

The only S. Indian plant in the Calcutta Herbarium that agrees with the figure given by Wight is that distributed from Wight's herbarium as n. 834 [K. D.] This in turn suits very well the description given of *D. Wightii* Baker.

DERRIS DISCOLOR Benth.

This, as has been already mentioned, is almost certainly merely that state of *D. cuneifolia* with ripe fruits.

89.* KUNSTLERIA PRAIN.

Climbing shrub with unequally pinnately 1-7-foliolate exstipellate leaves, stipules small deciduous. *Flowers* rather small in ample terminal thyrsoid panicles extending into the axils of the upper leaves, pedicels solitary, nodes not tumid. *Calyx* campanulate, teeth lanceolate, the two upper connate. *Corolla* distinctly exserted, standard ovate entire, keel boat-shaped, the petals slightly cohering. *Stamens* diadelphous, the upper one quite free from the other 9 and adnate at base to standard-claw; anthers versatile, uniform, on alternately short and long free filaments. *Ovary* sessile, few-ovuled, style incurved filiform, stigma capitate. *Pod* thin flat strap-shaped, membranous or coriaceous, indehiscent, style terminal, sutures not winged. *Seeds* 1-3, much compressed, oblong, radicle inflexed. Species 5, Malayan.

This genus has the habit of *Spatholobus* with calyx and almost corolla and stamens of that genus. It differs, however, in having solitary not fascicled flowers and in having exstipellate leaflets as well as in having a pod indehiscent throughout, with its seeds centrally not terminally situated, and thus not distinguishable from a *Lonchocarpus* pod. From *Lonchocarpus*, however, *Kunstleria* differs in having the flowers unfascicled, in having the calyx deeply toothed and in having the vexillary stamen free. As regards inflorescence *Kunstleria* repeats the characters met with in *Derris* § *Aganope* with which it further agrees in having a free upper stamen. But from *Aganope*, *Kunstleria* differs in having a wingless pod, a deep-toothed calyx, and in having the free stamen adnate to the claw of the standard.

The calyx characters suggest that the natural place for the genus might be in *Phaseoleæ* along side of *Mastersia*, but the absence of stipels and the fact that the leaves may be 5-7-foliolate, together with the rather marked affinities as regards pod with *Lonchocarpus* and as regards inflorescence with *Aganope*, seem to render it more advisable to place it in *Dalbergiæ* beside *Lonchocarpus* and *Derris*.

1. KUNSTLERIA CURTISII Prain, *Journ. As. Soc. Beng.* lxvi. 2. 110; leaflet 1, glabrous or subscabridly pubescent, pod thin flat, densely rusty-pubescent, 2-3-seeded.

VAR. *typica*; leaves above and petioles glabrous, beneath and petiolules sparsely adpressed-pubescent with white hairs, rachis and branches of panicles sparsely rusty-pubescent.

PENANG; Tulloh Bahang, *Curtis* 3019!

VAR. *laxiflora*; leaves on both surfaces subscabridly, petioles and

petiolules densely softly rusty-pubescent as are rachis and branches of the laxer more spreading panicles.

PANGKORE; Tulloh Sera, *Curtis* 1632!

Leaves 5-8 in. long, leaflet ovate-lanceolate apex acute base rounded, 4-6·5 in. long, 2·5 in. wide, nerves ascending 4-5 pairs prominent beneath; petiole ·75-1·5 in., petiolule ·25 in., attached subpeltately. *Panicles* 8-12 in. long, 5-8 in. across. *Calyx* ·15 in., teeth triangular, upper deltoid notched. *Corolla* ·25 in. long. *Pod* 5 in. long, 1 in. wide, rather distinctly reticulated, at least in the typical variety.

2. *KUNSTLERIA KINGII* *Prain, Journ. As. Soc. Beng.* lxvi. 2. 110; leaflets 3, glabrous on both surfaces, pod thin flat densely brown-silky, 1-2-seeded.

PERAK; Larut, *Kunstler* 3830! 6870! 6935!

An extensive climber, sometimes over 100 feet long. *Leaves* 5-8 in. long, leaflets ovate-lanceolate, 4-6 in. long, 1·5-2 in. wide, apex acute, base of lateral leaflets rounded, of central cuneate, nerves ascending 4-5 pairs prominent beneath; petiole 1·5-2·5 in., petiolule 2 in., attached marginally. *Panicles* 8-12 in. long, 5-8 in. across. *Calyx* ·15 in., teeth triangular except broadly deltoid bifid upper. *Corolla* dark-purple, ·25 in. long. *Pod* 2-4 in. long, 6 in. wide, 1-2-seeded, rather distinctly reticulated; seeds oblong, 1·25 in. long, ·5 in. wide, cotyledons thin and leaf-like, testa very dark-brown.

3. *KUNSTLERIA FORBESII* *Prain, Journ. As. Soc. Beng.* lxvi. 2. 111; leaflets 5, rigidly coriaceous subscabrid above, densely ferruginous beneath, shortly sharply acuminate.

PERAK; Salama, *Kunstler* 3094! *DISTRIB.* Sumatra; (at Bigni Telok, *Forbes* 3241!)

A small shrubby climber 6-10 feet long, with densely ferruginous branches. *Leaves* 8-10 in. long, leaflets elliptic 3·5-5 in. long, 2-2·5 in. wide, base round, apex rounded with a short abruptly acuminate tip, nerves spreading 6-9 pairs rather prominent beneath, petiole 3·5 in., petiolules ·25 in. attached marginally. *Panicles* rather strict, 12-18 in. long, 5-6 in. wide, dense-ferruginous. *Calyx* ·15 in., teeth lanceolate. *Corolla* deep lake-red, ·25 in. long. *Pod* not communicated.

4. *KUNSTLERIA RIDLEYI* *Prain, Journ. As. Soc. Beng.* lxvi. 2. 111; leaflets 5, firmly papery, glabrous on both surfaces, tips blunt-pointed, pod thin flat densely rusty-pubescent, 2-3-seeded.

SINGAPORE; *Ridley* 6395!

Leaves 6-8 in. long, leaflets elliptic 2-3·5 in. long, 1·25-2 in. wide, bases narrowed, apex tapering to a finally abrupt blunt point, nerves ascending 5-6 pairs rather prominent beneath, petiole 2-3 in., petiolules ·2 in. attached marginally. *Panicles* 12-18 in. long, 4-5 in. wide. *Calyx* ·15 in., teeth triangular except upper deltoid slightly notched. *Corolla* ·25 in. long. *Pod* 6 in. long, 1·25 in. wide, very similar to that of *K. Curtisi* but with wider-meshed reticulations.

5. *KUNSTLERIA DERRYI* *Prain, Journ. As. Soc. Beng.* lxvi. 2. 112 leaflets 7, rigid subscabridly pubescent on both surfaces, with cuneate apex.

MALACCA ; Machap Tebung road, Derry 1006 !

A climber with densely pale rusty-pubescent branches. *Leaves* 6-8 in. long, leaflets 1-3 in. long, .75-1.5 in. wide, bases of lateral leaflets rounded, of terminal deltoid, nerves ascending 6-7 pairs slightly prominent beneath, petioles 2.5-3 in., petiolules .2 in. marginally attached. *Panicles* 12-15 in. long, 2-3 in. wide, rachis and branches softly pale-rusty. *Calyx* .15 in. long, teeth triangular except upper broad notched. *Corolla* dark-purple, .25 in. long. *Pod* not communicated.

92. SOPHORA LINN.

6b. SOPHORA BAKERI *C. B. Clarke MSS.*; leaflets 11-15 oblong, obtuse, at first sparsely pubescent at length glabrous above, densely-pubescent beneath, pedicels shorter than the finely silky calyx; corolla middle-sized, pod silky. *Sophora* sp. *Bak.* in *Flor. Brit. Ind.* ii. 251.

BEHAR; Parasnath, Thomson! Kurz! Clarke! Manbhium, Campbell!

Branchlets sparsely puberulous. *Leaves* 6-8 in. long, leaflets papery 1.5-2 in. long, .6-.75 in. wide. *Racemes* 2-3 in. long, rather dense, half as long as leaves, pedicels .12 in. *Calyx* .25 in., subbilabiate, lower lip distinctly toothed. *Corolla* about twice as long as calyx. *Pod* 2-3 in., subdehiscent; joints oblong, silky, constrictions between them deep.

Nearest to *S. Wightii* but, as Mr. Baker suggests, very distinct.

6c. SOPHORA DUNII Prain; leaflets 17-19, narrowly ovate-acute, tip mucronulate, glabrous above even when young, softly densely-pubescent beneath as are the leaf-rachises, pedicels half the length of densely-tomentose calyx.

BURMA; Chin Hills, *C. R. Dun*!

Branchlets densely-pubescent. *Leaves* 6-8 in long, leaflets papery 1-1.5 in. long, .35-.45 in. wide. *Racemes* 4 in. long, rather lax, pedicels .12 in. *Calyx* .3 in., 2-labiate, upper lip ovate-oblong, obtuse, notched, lower of 3 ovate-acute teeth one-third the length of tube. *Corolla* one-half longer than calyx, keel and wings whitish, standard purplish-brown (in dried specimens). *Pod* not seen.

A very distinct species, only once reported. It much resembles, and is evidently most nearly allied to, *S. Bakeri* Clarke, but is very readily distinguished by its leaflets being quite glabrous above and its lower calyx-teeth being longer.

7b. SOPHORA PRAZERI Prain; leaflets 9-13, oblong subobtuse or acute obscurely silky beneath, pedicels as long as the finely silky calyx, corolla white medium-sized.

BURMA; beyond Meiktila, growing near streams, *Prazer*.

A small tree about 20 feet high, branchlets brown-puberulous. *Leaves* 4-6 in. long, leaflets membranous 1-2 in. long, .5-.75 in. wide, dark-green glabrous above, finely silky beneath. *Racemes* short peduncled, rather lax, axillary, 2.5 in. long, 10-15-flowered. *Pedicels* .25 in. long. *Calyx* green, .25 in. long, mouth very oblique, truncate, teeth obscure. *Corolla* pure-white, .6 in. long.

A very graceful species nearly allied to *S. acuminata* to which it bears much the relationship that *S. Bakeri* does to *S. Wightii*. The pods have not, so far, been reported.

9. *SOPHORA MOLLIS* *Grah.*VAR. *Duthiei*; pods wingless.CHITRAL; Markanda, 5000 feet, *Duthie* 16048!

A very interesting form, differing apparently in no way from ordinary *S. mollis* except in the absence of wings to the pods. Its existence rather effectively disposes of the attempt sometimes made to sustain, as a genus apart from *Sophora*, the section to which the species belongs.

9b. *SOPHORA GRIFFITHII* *Stocks in Hook. Journ. iv. 147*; flowers smaller, developed before the leaves in short crowded racemes, pods silky. *Keyserlingia Griffithii*, *Boiss. Flor. Orient. ii. 630*.

BRITISH BELUCHISTAN; Quetta, etc., *Griffith! Stocks! Rind! Hamilton! Duke! Lace! Duthie!* SULEIMAN RANGE; Fort Monro, *Sanders!* DISTRIB. Throughout Beluchistan and Afghanistan.

A low spineless shrub, all parts densely shortly hoary-pubescent. *Leaves* 4-8 in. long, leaflets 21-41, rigid, adpressed silvery, pubescent beneath, ovate or obovate, .25-.45 in. long, racemes few-fl'd., 1.5-2 in. long, pedicels shorter than the calyx. *Calyx* .2 in. long, very oblique, densely silky, teeth triangular obtuse. *Corolla* yellow, .5 in. long. *Pod* finely persistently silky, the joints with 4 faint longitudinal ridges.

This is so closely related to *S. mollis* that there are some stages in which it is difficult to distinguish the two; the rather shorter racemes with fewer flowers and the shorter pedicels being then the chief distinguishing marks. The leaflets are, however, almost always more numerous, and when full-grown are much smaller, remaining too, silvery-hairy beneath. But while, with Boissier, placing this in *Keyserlingia* (= *Sophora* § *Edwardisia*), the writer would point out that it might with almost as great propriety be placed in *Eusophora*, since even ripe pods have only 4 faint crenated ridges to represent the wings on the pods of *S. mollis*.

93. *ORMOSIA JACKS.*

2b. *ORMOSIA SCANDENS* *Prain, Journ. As. Soc. Beng. lxvi. 2. 147*; scandent, leaflets 5-7, ovate or obovate, oblong, shortly acuminate, dark-green, racemes crowded in terminal panicles, pedicels shorter than calyx.

PERAK; Larüt, *Kunstler* 3560!

A long climber sometimes reaching 100 feet, with glabrous branches. *Leaflets* coriaceous 6-9 in. long, acuminate, rounded at base, finely veined. *Racemes* in a terminal panicle reaching one foot in length, branches very finely grey-silky, bracts small, bracteoles subulate persistent. *Calyx* .25 in., grey-silky, three lower teeth deltoid as long as tube, two upper subconnate in a bifid lip. *Corolla* .35 in., white with reddish tinge, standard .25 in. across. *Ovary* with a line of hairs along upper suture, elsewhere glabrous; ovules 3. *Pod* unknown.

A very distinct species, differing much from the others by its scandent habit.

3. *ORMOSIA MACRODISCA* *Bak.*

Add to localities:—SINGAPORE; *Ridley!*

4. *ORMOSIA GLAUCA* *Wall.*

Add to localities:—SIKKIM; Sivoke Hills, 2500 feet, *Gamble* 7555!

Add to description of *F. B. I.*:—*Pod* hard, thick, 2-3 in. long,

1.25 in. broad, the valves blackish, rugose externally, slightly swollen opposite the ripe seeds, each thickened into a distinct rib along the upper suture; seeds 2-4, bright scarlet, small (.35 in. long, .25 in. wide), separated by partitions of the tawny suberous lining in which they are embedded, without any trace of arillus.

3b. *ORMOSIA GRACILIS* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 148; leaflets 7-9, ovate-lanceolate, pale grey-green, flowers in terminal racemes, pedicels shorter than calyx, pod rather small, irregularly orbicular with compressed thick valves.

PERAK; Larut, *Scortechini*! *Kunstler*! *Wray*!

A graceful tree with brown glabrous branches. *Leaflets* chartaceous, tips caudate-acuminate, 2.5-3 in. long, the veins immersed. *Racemes* in lax terminal panicles; bracts and bracteoles, especially the latter, minute but persisting. *Calyx* .25 in., finely silky, teeth rather longer than tube except the upper 2. *Corolla* pale-yellow, .35 in. long. *Ovary* ovate-lanceolate; ovules 2. *Pod* hard, thick, covered with a bluish-grey bloom, 1.5 in. long, 1.25 in. wide. *Seed* usually solitary, oblong, .75 in. long, with a black adnate smooth aril.

A very fine and distinct species.

4b. *ORMOSIA NITIDA* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 149; leaflets 7, obovate or elliptic very dark-green, shining above, flowers in terminal panicles, pedicels shorter than calyx, pod subcompressed with thin valves, seeds oval compressed bright-red, without arillus.

PERAK; Gopang, *Kunstler*!

A tree 30-50 feet high, with rusty-brown glabrescent branches. *Leaflets* very rigidly coriaceous, apex rounded abruptly cuspidate, glossy deep-green, 2.5-4 in. long, 1.5-2 in. wide, veins numerous slender. *Flowers* in fastigate panicles. *Calyx* .2 in. long. *Corolla* unknown. *Pod* irregularly oblong, 1 in. long, .75 in. across, thinly woody, rigid, quite glabrous, black externally, shortly stipitate. *Seed* usually, if not always, solitary, .35 in. long, .3 in. wide.

5. *ORMOSIA MICROSPERMA* Bak.

Add to synonyms:—*O. coarctata* Kurz, *Journ. As. Soc. Beng.* xlii. 2. 71, *hardly of Jackson*. Add to localities:—PERAK; *Kunstler*!

Mr. Kurz's reduction of *Chænolobium* Miq., to *Ormosia* is certainly just, but his further reduction of *C. septemjugum* and of *C. decemjugum* to each other and then to the species under review, seems somewhat premature; for the present Miquel's plants should be known as *Ormosia septemjuga* and *O. decemjuga*. They appear to be more nearly related to the next species than to *O. microsperma* but seem at the same time quite distinct from each other as well as from both *O. microsperma* and *O. sumatrana*. Like many of Dr. Miquel's species, these two were based on very inadequate material, certainly much too incomplete to have justified the foundation of a genus.

Add also as a new variety:—

VAR. *Ridleyi* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 151; pedicels distinct, pods more persistently pubescent.

SINGAPORE; Selitar, *Ridley* 5574!

The pods of this are not quite ripe. Mr. Ridley's field-note says they are hairy; should they prove to be quite persistently so it will probably be necessary to recognise in this plant still another species to be named *Ormosia Ridleyi*.

5b. *ORMOSIA SUMATRANA* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 150; leaflets 7-9 (rarely 5), short-stalked, veinlets beneath slender raised, pedicels shorter than calyx, pod subcompressed with thin valves, seed oblong; racemes in lax spreading panicles.

MALACCA; Brisu, *Holmberg!* DISTRIB. Sumatra.

A very great tree, with thinnish branches, grey-silky at length glabrescent. *Leaflets* ovate, or ovate-elliptic or obovate, 2-4 in. long, nerves spreading but prominent below, pale-green glabrous and glossy above, puberulous at length glabrescent beneath, rounded at base. *Branches* of panicle laxly spreading, tawny-silky. *Calyx* 2 in. long. *Corolla* pinkish-white with lilac-purple markings, 35 in. long. *Ovary* densely-puberulous almost always 3-ovuled. *Pod* irregularly orbicular if 1-seeded, oblong if 2-seeded, 1 in. across, 1-1.7 in. long, lineate between the seeds; valves thin woody rigid black glabrescent. *Seed* 4 in. long, 35 in. wide, bright-red, without arillus.

Closely related to *O. microsperma* but very distinct by its more lax inflorescence, smaller flowers, larger seeds and different leaves and bracts.

6. *ORMOSIA PARVIFOLIA* Bak.

Add to localities:—SINGAPORE; *Ridley!* PAHANG; *Ridley!* DISTRIB. Banka; Borneo.

96. *CÆSALPINIA* LINN.

SUBGEN. 1. *GUILANDINIA* Linn.

2b. *CÆSALPINIA MINAX* Hance, *Journ. Bot.* xxii. 365; VAR. *BURMANICA* Prain; leaves stipulate, leaflets small, bracts very large enveloping the young flowers in a strobilate head; bristles of pod subadpressed and pubescent.

BURMA; Shan States, Fort Stedman and Saga, *King's Collectors!* DISTRIB. China (VAR. *typica*.)

Shrubby diffuse, branches at first downy at length glabrescent, with numerous straight or slightly hooked hard prickles. *Leaves* 1 foot long or more, pinnæ 10-12, leaflets 6-10 pairs subsessile elliptic or oblong, setaceous apiculate; stipules subulate rigid 2-3-fid. *Racemes* long-peduncled many-flowered, simple sparingly branched near base; bracts large oblong-acuminate, tomentose, 75 in. long, 5 in. wide, pedicels 6 in. long, (in fruit becoming 1.25 in. long). *Calyx* 75 in. long. *Petals* obovate white, 1 in. long. *Pods* hardly stipitate, 4 in. long, nearly 2 in. wide, elliptic-oblong, compressed, apex obtuse and beaked near lower corner. *Seeds* 6-7, 75 in. long, 35 in. wide, almost cylindric, testa black.

There being no specimen of the true *Cæsalpinia minax* at Calcutta with which to compare the Shan Hill plant above described, a specimen was sent to London for comparison with the type of Mr. Hance's species which is preserved in the British (Natural History) Museum collection. The comparison has been most kindly made by Mr. E. G. Baker and Mr. Britten; Mr. Baker has supplied the following note:—

"The Burmese plant is certainly very closely allied to *C. minax* Hance but differs "in the following points. The legume of *C. minax* is shorter by about $\frac{1}{4}$ in., the

"bristles stand *erect* from the pod and are glabrous; the apiculus at the end of the "pod in the Burmese plant is longer and at the base *more bristly* than in *C. minax*. "The leaves not being in the same state in the two specimens cannot be quite definitely compared. The bracts of the inflorescence of *C. minax* have a narrow "white margin and the head is more broadly conical than in the Burmese plant."

Both Mr. Baker and Mr. Britten think therefore that the Burmese plant cannot be considered typical *C. minax*. One other difference may be mentioned; the flowers are noted as "white" in the Shan Hill specimens, Mr. Hance mentions "purple" in connection with the Chinese one. As a temporary measure it is treated here as only a variety of *C. minax* but it may ultimately be necessary to recognise in it a distinct species, to be known as *Cæsalpinia burmanica*.*

SUBGEN. 2. NUGARIA DC.

3. CÆSALPINIA NUGA Ait.

The species that is most nearly allied to *C. Nuga* is *Mezoneuron sinense* Hemsl. which, with the habit of *C. Nuga*, has also pods that are very similar in shape and in consistence and differ only in being narrowly winged down the upper suture. Perhaps the most convenient and at the same time most natural arrangement would be to remove *M. sinense* from *Mezoneuron* and at the same time to take *C. Nuga* out of *Cæsalpinia* treating them as congeneric and as types of a genus *Nugaria* equally related to, but equally distinct from, both *Cæsalpinia* and *Mezoneuron*. Still the mere fact of having pods slightly winged along the upper suture hardly prevents the Chinese species from being treated as a *Cæsalpinia*, since *C. sepiaria* presents in SUBGEN. *Eucæsalpinia*, though not so markedly, the same peculiarity. The Chinese plant certainly must be removed from *Mezoneuron*.

4b. CÆSALPINIA PARVIFLORA Prain, *Journ. As. Soc. Beng.* lxi. 2. 230; puberulous, pinnæ 18-24, leaflets 30-36, usually small, oblique, the lower corner auriculately produced, stamens little exerted, pod oblique 3-4-seeded; leaves stipulate; flowers very small and numerous.

VAR. *typica*; leaflets not exceeding .5 in., stipules lanceolate, deciduous.

PERAK; at low elevations, *Kunstler! Wray!*

VAR. ? *stipularis* Prain, *loc. cit.*; leaflets exceeding .75 in., stipules ovate-oblong, persisting.

PERAK; in the plains, *Wray!*

A climber, or sometimes arborescent; prickles small and few. *Leaflets* rachis 8-10 in. long; leaflets close sessile subcoriaceous, attached in middle of base but with lower corner auriculately produced. *Panicles* very long, and usually again branching, the young branches rusty-pubescent; bracts small linear or lanceolate, deciduous; pedicels .25 in. *Calyx* .25 in., puberulous. *Filaments* densely woolly in the lower half. *Ovary* sparsely puberulous. *Pod* 1 in. long, .5 in. wide, like that of a miniature *C. Sappan*.

This *Cæsalpinia* in foliage resembles *C. tortuosa* and *C. microphylla* but its pod is that of a small *C. Sappan*; by its very small greenish-yellow flowers it is quite distinct from all the other Indian ones. The variety may prove a distinct species.

* Since this was written the Calcutta Garden has succeeded in obtaining seeds of this very interesting species from the Shan Hills, and these have been distributed to the leading Botanic Gardens in both Hemispheres.

9. *CÆSALPINIA MICROPHYLLA* Ham. in *Wall. Cat.* 5826. *C. cinclidocarpa* Bak. in *Flor. Brit. Ind.* ii. 256.

The species described as *C. cinclidocarpa* in the *Flora of British India* differs from the plant described by Dr. Miquel in having a glabrous calyx. There is no specimen of genuine *C. cinclidocarpa* at Calcutta for comparison with the Assam plant; but even if the two should prove to be identical, there is no reason why Dr. Buchanan-Hamilton's much older name should give place to Dr. Miquel's more recent one.

The species is also very common in Sikkim and Western Bhutan.

10. *CÆSALPINIA TORTUOSA* Roxb.

Add to localities of *F. B. I.*:—PENANG; Rengra Bukit, 700 feet, *Curtis*!

Mr. Kurz proposes to reduce to this species, as a variety (*var. latifolia*), Dr. Miquel's *C. acanthobotrya* from Sumatra; an examination of an authentic specimen of Dr. Miquel's plant (*Diepenhorst* 2240, from Sumatra) leads the writer to believe that it is much better to treat the two as distinct species.

97. PELTOPHORUM VOG.

There are, in Herb. Calcutta, specimens of a very distinct species of this genus from Sumatra with flowers white, tinged with pink;* the generic diagnosis has therefore to be altered slightly in order to admit of its inclusion.

98. MEZONEURON DESF.

2. *MEZONEURON FURFURACEUM* Prain. *M. glabrum* Bak. in *Flor. Brit. Ind.* ii. 258 not of Desf. *M. enneaphyllum* Thw. *Enum.* 414; *Trimen, Fl. Ceylon* ii. 102 not of W. & A. *Cæsalpinia furfuracea* Wall. *Cat.* 5835.

MARTABAN; Attran river, Wallich 5835! PEGU; Makhoye Hill, King's Collectors! CEYLON; Thwaites 3601!

The locality of Dr. Wallich's specimens is given as Tenasserim in the *F. B. I.*; the species has not, however, been as yet collected farther south than Martaban. This most certainly is not *M. glabrum* Desf. for it has always opposite leaflets whereas those of *M. glabrum* are alternate; also it has pods with few remote seeds in place of having them numerous and close together as in *M. glabrum*. The leaflets of this species are more remote and fewer in number, they are also more broadly ovate, with obtuse

* The following diagnosis of this species may be given:—

PELTOPHORUM GRANDE Prain; flowering pedicels slightly exceeding the calyx, petals white with flush of pink.

SUMATRA; on hills near Napal Litjin, R. Rawas, at 2500 feet, *Forbes* 3163!

A very large tree, stem 7 feet in circumference at 6 feet from ground, young branches rusty-puberulous. *Leaves* distinctly petioled, 6 in. to 1 foot long; pinnæ opposite 14–16, 3–6 in. long; leaflets 20–24, somewhat remote, ligulate, sessile, rounded, slightly unequal-sided, base cuneate, rigidly subcoriaceous, faintly adpressed-puberulous below. *Racemes* simple, rusty-puberulous as are the pedicels .3 in. long, and the calyx; bracts very sinuate caducous. *Calyx* .2 in. deep. *Pod* not seen.

A very distinct species.

tips and unequal bases, than are the leaflets of *M. enneaphyllum* which have rounded tips and equal bases. But the most striking difference is in the pod which is much larger, and has a much broader wing than that of *M. enneaphyllum*; it is besides rather prominently widely reticulated throughout while the pod of *M. enneaphyllum* is smooth. Dr. Thwaites' misidentification of the Ceylon plant with *M. enneaphyllum* in place of *M. furfuraceum*, has unfortunately found its way both into the *Flora of British India* and the *Handbook of the Ceylon Flora*.

Dr. Trimen suggests that *M. pubescens* may be included in this species; in this he follows Mr. Kurz who united (*Journ. As. Soc. Beng.* xlv. pt. 2, 293), *M. glabrum*, *M. enneaphyllum*, and *M. pubescens*. The recent accession of large suites of specimens shows, however, that Mr. Kurz's proposition is altogether untenable and proves, moreover, that neither *M. glabrum* nor *M. pubescens* occurs in India.

3. MEZONEURON ENNEAPHYLLUM W. & A.

Delete from localities:—CEYLON. Add to localities:—ANDAMANS; Great Coco, *Prain*!

4. MEZONEURON HYMENOCARPUM W. & A. *Prodr.* 283. *M. pubescens* Bak. in *Flor. Brit. Ind.* ii. 259 not of Desf. *Cæsalpinia* Glenniei Thw. *Enum.* 414 in part. *C. hymenocarpa* Wall. *Cat.* 5832.

BURMA; Taong-Doung, *Wallich* 5832! Meiktila, *Collett* 839! Prome, *Kurz* 2568! Shan States, *King's Collectors*! Bhamo, *King's Collector*! ANDAMANS; very common. CEYLON; *Thwaites* 3815 in part!

This has alternate leaflets, much fewer in number than those of *M. pubescens* to which it bears something of the relationship that *M. glabrum* bears to *M. furfuraceum*; it is, however, just as distinct from *M. pubescens* as these two species are from each other.

Somewhat similar to this, but equally distinct, is a species from Tonkin (*Balansa* 2149). The leaflets resemble those of *M. hymenocarpum*, but are more densely pubescent; the pods, too, are very different, being firm and rigid. The calyx of *M. Balansæ* likewise differs considerably from that of this species and resembles the calyx of *M. sulphureum*.

4b. MEZONEURON KUNSTLERI *Prain, Journ. As. Soc. Beng.* lxvi. 2. 233; leaflets 7–9, medium, rigid ovate-acute, glabrous, stamens much exceeding the calyx.

PERAK; *Kunstler* 895!

A large climber, all parts glabrous. *Pinnæ* 8, leaflets 1·5 in. long, '75 in. wide, subcoriaceous. *Racemes* laxly paniced, pedicels patent. *Flowers* bright-yellow, calyx quite glabrous. *Pod* only seen young.

4c. MEZONEURON ANDAMANICUM *Prain, Journ. As. Soc. Beng.* lxi. 2. 131. (*Nov. Ind.* v. 60).

5. MEZONEURON SUMATRANUM W. & A.

Add to localities of *F. B. I.*:—PERAK; Thaipeng, *Scortechini* 1766! Simput, *Ridley* 3083!

99. PTEROLOBIUM R. BR.

The three varieties of *P. indicum* distinguished in the *F. B. I.* form in reality three very distinct species.

1. *PTEROLOBIUM INDICUM* A. Rich.

Specimens of this have been collected by Dr. King in Dehra Dun and by Col. Beddome in the Godavery Jungles or the Circars, thus proving a considerably more extensive distribution northward and eastward in India than has been suspected hitherto; the majority of the specimens previously collected had been obtained in the Nilghiris or the Pulney Hills.

2. *PTEROLOBIUM DENSIFLORUM* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 236; racemes with thick rachis and very close set pedicels not exceeding the calyx, in fastigate panicles. *P. microphyllum* Kurz, *Journ. As. Soc. Beng.* xlii. 2. 71 not of Miq. *P. indicum* var. *microphyllum* Bak. in *Flor. Brit. Ind.* ii. 259 at least in part.

PENANG; Govt. Hill, 2500 feet, Curtis 3093! MALACCA; Maingay 535! TENASSERIM; Helfer (fide Baker).

A large climber, very strongly armed, somewhat resembling *P. indicum*. Leaves 4-8 in. long, pinnæ 4-8 pairs, leaflets 8-10 pairs, subcoriaceous, glabrous, 6 in. long, 25 in. wide. Pedicels 25 in. long, racemes 150-200-fl. Pod 2 in. long, with an obtuse or obliquely acute wing 1.25-1.5 in. long, 5-7 in. wide.

Maingay n. 535 which is *P. microphyllum* Kurz, and is in part *P. indicum* var. *microphyllum*, Bak., is represented in Herb., Calcutta by a specimen of which the leaf has only 7 pairs of pinnæ. Curtis n. 3093 from Penang is the same plant; its leaves have 4-8 pairs of pinnæ; its leaflets are as described above. Obviously then it cannot be *P. microphyllum* Miq., which has linear leaflets 40-44 in number upon 14-16 pairs of pinnæ. The Tenasserim plant mentioned in the *F. B. I.* is not at Calcutta; all our Burmese and Andamans specimens belong to the next species.

3. *PTEROLOBIUM MACROPTERUM* Kurz, *Journ. As. Soc. Beng.* xlii. 2. 71; racemes with thin rachis and lax pedicels much exceeding the calyx, in spreading panicles. *P. indicum* var. *macropterum* Bak. in *Flor. Brit. Ind.* ii. 259.

BURMA; common. ANDAMANS; very common.

A large climber; very weakly prickly, otherwise like *P. indicum*. Leaves 6-9 in. long, pinnæ 7-8 pairs, leaflets 7-10 pairs, papery, 45 in. long, 25 in. wide. Pedicels 4-5 in. long, racemes 20-30-fl. Pod 2.5-2.75 in. long, with an obtuse wing 2 in. long, 7-8 in. wide.

The leaflets of this are rather larger and firmer than those of *P. indicum* but are neither so large nor so firm as those of *P. densiflorum* (*P. microphyllum* Kurz, not Miq.). The plant is much less formidably prickly than either of these; from the first it differs most markedly in pod, from the second most markedly in inflorescence. Mr. Kurz describes the flowers as white.

103. *CASSIA* LINN.1. *CASSIA FISTULA* Linn.

It should be noted that in Herb. Calcutta there is a gathering of *Cassia Fistula*, the well-known *Amaltás* or "Indian Laburnum," from Chittagong, which is reported by one of our native collectors as having had pink flowers. It would be interesting if any of the members of the Society were able to confirm this report. The statement is not impossible since at least one other species of this section has both pink and

yellow flowers; but, if true, it is remarkable that a pink-flowered form of *Amaltás* should not have found its way into Bengal gardens.

2b. *CASSIA JAVANICA* Linn.

This species, which had not (*see F. B. I. ii. 267*) up to 1878 been reported from within the British area, has recently been sent by Mr. Wray from Perak. Mr. Wray gives "*Sibusoo*" as the native name of the tree; this name is usually applied to *P. nodosa* which is very plentiful in the Malay Peninsula. But, as Mr. Baker points out, the two species are very closely related and that they should bear the same Malay name is not therefore a matter for surprise.

4. *CASSIA RENIGERA* Wall.

Very many gatherings of this species have been received in Herb. Calcutta since Mr. Baker's description was written in 1878. At that time the flowers were still unknown; the following description of them is therefore necessary.

Flowers in showy corymbs, solitary or in pairs, from old nodes, on softly pubescent peduncles 1-1.5 in. long, bracts large puberulous, ovate-cordate, long-acuminate .75 in. long, .5 in. across, lower pedicels 2 in. long, pubescent; calyx 5-partite to the base segments ovate softly velvety; petals oblong-obtuse clawed, .8-1 in. long; the 3 lower stamens longer than the rest with larger anthers and with nodose filaments.

The most puzzling feature about these specimens is that of the gatherings where the colour of the flower has been noted, some are said to be pink-flowered and just as many are said to be yellow-flowered; yet there is no character in the inflorescence, bracts, sepals or petals, whereby the two may be distinguished. The attention of members of the Society, resident in Burma, is therefore directed to the point and their assistance in clearing up the matter will be very gratefully received by Indian botanists. It may be added that all the specimens noted as pink-fl. are from Pegu; all the yellow-flowered ones come from the Shan Hills.

5. *CASSIA OCCIDENTALIS* Linn.

This does not appear ever to have the pale-lilac flowers described in the *F. B. I.*; the petals are pale-yellow faintly veined with orange.

6b. *CASSIA HIRSUTA* Linn. *Sp. Pl.* 378. Mentioned in the *F. B. I.* under *C. tomentosa*: appears now to be quite naturalized in many parts of our area. The species in general habit most resembles *C. occidentalis*; like that species and like *C. Sophora* its leaves have a single large gland near the base of the petiole: it is, however, readily distinguished from both plants by its dense pubescence. In inflorescence it resembles *C. Tora* as its flowers are in subsessile pairs in the leaf-axils. Outwardly too its pods resemble those of *C. Tora* except that they are densely villous; the dissepiments however are transverse, not oblique, and the seeds are broadly ovate as in *C. occidentalis* not rhombohedral as in *C. Tora*. The following are localities from which specimens growing in a 'wild' state have been sent to Herb. Calcutta.

MYSORE; Bababoodun Hills, Talbot 2343! MADRAS; St. Thomé, Pillay! ASSAM; Nowgong, Simons! SINGAPORE; common, Anderson 44! Hullett 75! Kunstler 317!

7. *CASSIA TORA* Linn.

As defined in the *F. B. I.* this name covers two very distinct species:—1. *CASSIA TORA*, with leaves glaucous or glaucescent beneath, very fœtid; with short pedicels and smaller flowers, the pedicels in fruit not exceeding .35 in.; and with two glands on the leaf-rachis, one between each of the two lower pairs of leaflets.

2. *CASSIA OBTUSIFOLIA* Linn. (*C. toroides* Roxb.) with leaves green beneath, not fœtid; with long pedicels and much larger flowers, the pedicels even in flower reaching 1 in.; and with one gland only on the leaf-rachis, situated between the leaflets of the lower pair.

C. Tora is common everywhere throughout our area; it is a native of the Eastern Hemisphere and may, as is sometimes stated, have become introduced in America; the writer has never, however, seen an American example; all the specimens bearing the name *C. Tora* that have been sent to Calcutta from America are *C. obtusifolia*. *C. obtusifolia* is common in some parts of our area, notably in Western India from Kanara northwards; in Scinde, Panjab and Rajputana, and in the Western Himalayas from Hazara to Garhwal and Dehra Dun; there are also some specimens from Behar and from Burma and it is quite common in Singapore. Elsewhere in India, if it occurs at all, it is very rare. It is an American species comparatively recently introduced to the Eastern Hemisphere.

The two plants differ so constantly and so markedly in such a number of particulars that they must be separated as species. The fœtid small, strongly veined glaucous leaves, and short pedicels of *C. Tora* always accompany the existence of 2 glands to the leaf-rachis and, even on the most cursory examination, distinguish it from *C. obtusifolia* with its green leaves less prominently nerved, its long pedicels with very much larger flowers—characters always associated with the presence of but one gland on the leaf-rachis.

The confusion between the two plants goes back to Linnæus who referred to *C. Tora* (which he defines as having leaves with 2 glands) the plant figured by Dillenius in *Hort. Eltham.* as t. 63, f. 73. That figure shows no glands. But Linnæus is probably right in identifying it with the plant here described as *C. Tora*; at all events it has the strong nerves, the short pedicels and the quadrate pods of that species.

As *C. obtusifolia*, Linnæus has quoted the figure by Dillenius in *Hort. Eltham.* t. 62, f. 72. This is likewise figured without glands, and since in diagnosing the species Linnæus omits all allusion to glands, one is tempted to suppose that the name *C. obtusifolia* was based on this Dillenian figure. But this cannot be the case; M. De Candolle mentions having actually seen a specimen of *C. obtusifolia* Linn., and he defines the species as having leaves with a single gland. This sets the question at rest once for all, and makes it clear that so far as the plant itself is concerned, *C. obtusifolia* Linn. is the species that was later on more fully described and more accurately characterised by Roxburgh than it had been by Linnæus, under the name *Senna toroides*.

All authors have agreed that the figure of *Gallinaria rotundifolia* Rumph., cited by Linnæus as his *C. obtusifolia*, is without a doubt *C. Tora*; it has not been so generally noted that the figure in Dillenius (t. 62, f. 72), by its very name "*fœtida*," by its pronounced nerves, and by its short pedicels would appear to differ from the real *C. obtusifolia* and would seem to be only another form of the plant shown in t. 63, f. 73, and therefore to be likewise *C. Tora*. In fact the only Linnean reference

that probably *does* go with the actual plant is that to Sloane's *Hist. of Jamaica*; this, oddly enough, Linnæus refers only tentatively to his species.

Wight and Arnott have disposed of the difficulty by recognising the plant with one gland as distinct from that with two; they treat the former as a mere variety of *C. Tora* however, and they complicate matters still further by identifying with it Rheede's *Tagera* (*Hort. Malab.* ii. t. 53). Rheede's figure shows no glands at all any more than do the two figures of Dillenius. But its strongly veined leaves, its short pedicels and its short pods make it certain that it represents *C. Tora* and not *C. obtusifolia*.

Miquel deals with the two plants themselves exactly as Wight and Arnott do, but has been unable to resist the temptation of still keeping up a *C. obtusifolia* Linn., apart from either. For this he cites Plumier's *Plantæ Americanæ* (Ed. Burmann) t. 76, f. 2, again a figure showing no glands; the plant itself Burmann describes as having a gland at the base of each pair of leaflets. This may mean that Miquel doubts the accuracy of M. De Candolle's statement that Linnæus' specimen of *C. obtusifolia* has but one gland, or may imply that he prefers to follow Linnæus as to his citations but not as to his plant. Plumier's figure is what constitutes VAR. β of Linnæus' *Cassia Tora*; it has, according to Royen and to Burmann, but one gland. Miquel cites the Plumierian plate under VAR. *a* of his *C. obtusifolia* and VAR. *a* he describes as having two glands, while Linnæus' name for the Plumierian plate he refers to his own VAR. β , which he says has one gland.

Mr. Baker proposes to unite the two species and it would have been very convenient had this been possible. But the differences between them are too marked and too constant to admit of this being done.

8b. *CASSIA LÆVIGATA* Willd. *Enum. Hort. Ber.* 401 is another species that, since Mr. Baker's account of the genus in the *F. B. I.* was published, has proved to be thoroughly naturalised in various parts of India, *e.g.*, in the Nilghiris near Ootacamund, in Sikkim, and notably in the Khasia Hills near Shillong, at Cherrapunji and elsewhere.

In general appearance it resembles *C. occidentalis* but it has larger flowers and may further be at once recognised by its leaf-rachis having a gland between each pair of leaflets except the terminal pair. When mature it is very easily distinguished by its fruits which are short turgid cylindric obtuse and distinctly stipitate below, obtuse and apiculate at the tip, 2.5–3 in. long, .6 in. in diam., finely transversely striate. *Seeds* smooth broadly ovate, compressed, greenish-brown, shining, .2 in. long, .15 in. wide, .08 in. thick.

9b. *CASSIA HOLOSERICEA* Fresen. in *Flora* xxii. i. 54; stipules triangular reflexed rigid spinescent persistent; leaflets 10–16, velvety-pubescent, racemes narrow, pod flat oblong little recurved not crested in the middle, velvety-pubescent.

SCINDE; *Stocks!* *Dalzell!* *Talbot!* *DISTRIB.* Westward to Abyssinia.

This very closely resembles *C. obovata*, for which indeed it is usually taken, but can be at once distinguished by its pubescent more numerous leaflets and by its pubescent less recurved, uncrested pods. In habit and in the dimensions of all its parts it agrees with *C. obovata*.

12. *CASSIA MONTANA Heyne.*

Add to synonyms of *F. B. I.*:—*Senna glauca Roxb. Fl. Ind. ii. 351.*

13. *CASSIA TIMORIENSIS DC.*

Add to synonyms of *F. B. I.*:—*C. xanthocoma Miq. Anal. Ind. i. 10.*

Add to localities:—WESTERN INDIA; Kanara, Talbot! MALAY PENINSULA; Kedah, Curtis! Perak; Kunstler! *Scortechini!*

14. *CASSIA GLAUCA Lamk.*

No collector has ever sent to Calcutta a specimen that could be said to accord with the description of *C. fastigiata* Vahl, reduced here in the *F. B. I.* Perhaps, as Wight and Arnott suggest, Vahl may have made some mistake as to the number of glands. In any case Vahl's description is such that if *C. fastigiata* has to be reduced to *C. glauca*, it is under *VAR. suffruticosa* and not under the typical *C. glauca* that it must be placed.

18. *CASSIA MIMOSOIDES Linn.*

VAR. 1. dimidiata is *C. dimidiata* Roxb., a very distinct species with 5 stamens of which not infrequently the uppermost is smaller than the others and is sometimes even replaced by a staminode.

VAR. 2. Wallichiana as to citation consists of two very distinct plants, both of which, as it happens, are mixed under *Wall. Cat. 5320.*

One of these is the same plant as *C. myriophylla* Wall. Cat. 5326—and is no doubt a mere variety of *C. mimosoides* distinguishable, with difficulty in many cases, by its rather longer leaflets. Like the type it has small flowers with apparently always 10 stamens and has the petiolar gland deeply embedded in the leaf stalk.

The other is the plant described by Mr. Baker as *VAR. Wallichiana*, easily distinguished by its larger flowers: in this plant often only nine, sometimes only seven, of the stamens are perfect and the petiolar gland, though not stalked, protrudes distinctly above the upper surface of the leaf-stalk. The best name for the species is *C. Leschenaultiana* DC.

VAR. 3. auricoma is only a more hirsute condition of the preceding. It is equivalent to *C. Macræi*, but it should not be separated as more than a variety from *C. Leschenaultiana*.

19. *CASSIA NIGRICANS Vahl. Symb. i. 30*; gland of petiole sessile obscure, stamens 10, all perfect or 1–3 rudimentary, seeds 7–11. *DC. Prodr. ii. 498*; *Oliv. Flor. Trop. Afr. ii. 280.* *C. micrantha Guill. & Perr. Pl. Seneg. i. 262.*

WESTERN INDIA; N. Canara, Stocks! Talbot! Woodrow!

An undershrub or shrub sometimes 5 feet high, sparsely pilose. *Leaves* distichous 2–4 in. long, with an obscure sessile gland below the lowest of the 8–18 pairs of oval-oblong obtuse mucronate leaflets 5–1 in. long. *Stipules* persistent lanceolate-subulate. *Flowers* small 25–35 in. across, solitary or 2–5 together in short supra-axillary pedicels. *Sepals* 2 in long, outer acute, inner obtuse, apiculate. *Pods* erect nearly straight, flat, dehiscent, shortly pubescent, 7–11-seeded; fruiting pedicels stout, 15 in. long.

This species is said by Talbot to be common in North Canara. It is most like *C. mimosoides VAR. Wallichiana* but is readily recognised by its large leaflets, which dry black, and by its smaller flowers and fewer-seeded pods.

104. CYNOMETRA LINN.

1. CYNOMETRA RAMIFLORA Linn.

SUBSP. *genuina*; leaflets 1-jugate. *Rumph. Herb. Amboin.* i. t. 63; *Lamk, Ill.* 331. f. 2.

MALAYA ARCHIPELAGO; Java, *Horsfield!* Amboina, *Teysmann!* Ceram, *Teysmann!*

This subspecies has never been collected in Indian territory; it may be necessary to restrict the name *C. ramiflora* to this and recognise in the next subspecies a distinct plant.

SUBSP. *bijuga*; leaflets 2-jugate. *C. bijuga* Span. *Linnaea* xv. 201.

VAR. 1. *mimosoides* Bak.; the end-leaflets obtuse hardly larger than the basal pair. *C. mimosoides* Wall. *Cat.* 5817. *Rheede Hort. Malab.* iv. t. 31.

BENGAL; Sundribuns, common, *Heinig!* S. INDIA; Malabar, *Rheede* (ic.)! CEYLON; at Trincomalee, *Rottler* (part of Wall. *Cat.* 5816C)! BURMA; Arracan, *Kurz!* Martaban, *Wallich* 5817 A! *Kurz!* Tenasserim, *Wallich* 5817C! *Proudlock!* ANDAMANS; very common everywhere on the coasts.

VAR. 2. *heterophylla* Thw., *Enum.* 97; the end leaflets acute much larger than the basal pair. *C. bijuga* Miq. *Flor. Ind. Bat.* i. 78. *C. ramiflora* Bedd. *Fl. Sylvat.* t. 315 not of Linn. *C. polyandra* Miq. *Anal. Bot. Ind.* i. 11, not of Roxb.

CEYLON; sea-coast, *Walker!* ANDAMANS; Coco Group, and S. Andaman, very rare. MALAY PENINSULA; Johore, *King!* Perak, *Wray* 2503! Singapore, *Ridley* 5891. DISTRIB. Malay Archipelago.

There are many intermediates between these two varieties, but there are no forms linking either of them with subspecies *genuina*. In a monograph of the genus it will probably be found advisable to recognise SUBSP. *bijuga* as specifically distinct and in that case it will be necessary to restore Wallich's name *C. mimosoides* (which is older than the name *C. bijuga*) to designate it. But it will always be well to keep the two varieties of SUBSP. *bijuga* apart as such.

Wall. *Cat.* 5816 is exceedingly confused—the following are the plants included under it in the Herb. Calcutta series of Wallich's specimens:—

5816 A. Herb. Madras = *C. cauliflora* L.

5816 B. Herb. Heyne = *C. cauliflora* L.

5816 ? C. { Herb. Madras = *C. polyandra* Roxb. VAR. *typica*.
Trincomalee = *C. ramiflora* (*C. bijuga*) VAR. *mimosoides*.

5816 ? D. Herb. Wight = *C. ramiflora* L. VAR. *mimosoides*.

5816 E. Penang = *C. polyandra* Roxb. VAR. *Kurzii*.

2b. CYNOMETRA BEDDOMEI Prain; leaflets 6, flowers in rather lax oblong sessile solitary axillary racemes.

S. INDIA; S. Kanara, *Beddome*; Wynaad, at Tambacheri Ghat, 2800 feet, *Beddome!*

A tree, leaflets thinly subcoriaceous, glabrous, oblique obovate-oblong, the lowest pair the smallest 2-3 in. long. *Flowers* in rather lax, few-fl'd. racemes, 1 in. long, outer bracts ovate-acute .25 in. long, pedicels faintly puberulous .5 in. long. *Sepals* .2 in. long, reflexed. *Filaments* twice the calyx. *Ovary* puberulous except along the side whence the style arises, which is quite glabrous. Ripe *Pods* not seen.

This species is mentioned by Col. Beddome under t. 316 of the *Flora Sylvatica* and again by Mr. Baker under *C. inaequalifolia* in the *Flora of British India* ii. 268, apropos of S. Kanara specimens which the writer has not seen. In 1880 Col. Beddome sent to Dr. King from the Wynaad two specimens with the note :—"Cynometra n. sp. This is mentioned at tab. 316, *Fl. Sylvatica*." They are in flower and in very young fruit, and the above diagnosis is made from them. The plant, as Mr. Baker suggests, is nearest *C. inaequalifolia* but is abundantly distinct from that species.

4. CYNOMETRA CAULIFLORA Linn.

The expanded filaments of this species make its flowers very readily distinguishable from those of *C. ramiflora* L. SUBSP. *genuina* which it much resembles in leaves.

It is a purely garden species without the slightest right to be considered indigenous in India.

5. CYNOMETRA POLYANDRA Roxb.

VAR? *Kurzii* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 200; leaflets large, pods very rugose. *C. cauliflora* Wall. *Cat.* 5816 (E only).

PENANG; *Jack* (Wall. *Cat.* 5816 E)! *Kurz*! on Govt. Hill "Apl 1890" and "May 1893," *Curtis*! PERAK; *Scortechini*!

This has the puberulous leaf-rachis of typical *C. polyandra* but its very different pod makes the writer believe that it may be necessary to recognise in it a distinct species, *C. Kurzii*. Up till now only leaf specimens of this have been obtained by Jack, Curtis and Scortechini, with a solitary fruiting specimen obtained by Kurz. There are no specimens of *C. polyandra* proper from Penang or from Malacca in the Calcutta Herbarium.

105. SINDORA Miq.

This genus has been long known but apparently usually little understood. First described by Rumphius under the name "*Caju Galedupa*" and quite unmistakeably depicted in *Herb. Amboin.* ii. t. 13, it thus forms as to citation a part of the genus *Galedupa* Lamk. (*Encycl. Meth.* ii. 594 [1786]); the description there given applies, however, only to the "*Pungam*" of Rheede (*Hort. Malab.* vi. t. 3) which is the basis of the genus named *Pongam* by Adanson (*Fam.* ii. 322 [1763]) and which is still known under a less barbarous form of this name (*Pongamia*) proposed in 1803 by Ventenat; the form *Pungamia* proposed by Lamarck in 1797 on his discovery of the error of his identification of 1786, has not, for some reason, been generally accepted.

Willdenow (*Sp. Pl.* iii. 902 [1799]) in pointing out that his *Dalbergia arborea* is the plant described by Lamarck as *Galedupa indica* has been careful to exclude the Rumphian synonym. And Buchanan-Hamilton, one of the ablest critical botanists of his day, suggested the affinity of Rumphius' plant with *Copaifera*, to which it is indeed exceedingly closely allied. But in opposition to the sound judgment of Willdenow and in spite of the very happy suggestion of Hamilton, Wight and Arnott

have taken the unfortunate, and for them quite unusual, view of supposing that Rumphius had made a mistake as to the number and position of the leaflets in his figure. It has, however, been left to Kuntze (*Rev. Gen. Pl.* i. 167) to revert to the error of Lamarck's early work and to propose the use of a part of Rumphius name, not for the tree that Rumphius describes and figures but for one that he has accurately figured and described in another volume under the name *Malaparius*.

Miquel in 1860 (*Flor. Ind. Bat. Suppl.* 286) founded on fruiting specimens of a species nearly allied to Rumphius' *Galedupa* the genus *Sindora*, while Benthham in 1865 founded on flowering specimens of a third species the genus *Echinocalyx* (*Gen. Pl.* i. 584); Mr. Benthham expressed, however, a presentiment that the two plants *Sindora* and *Echinocalyx* might prove congeneric. The discovery of other specimens in the Wallichian Herbarium, where they had been treated by Graham as belonging to *Guilandina*, completely confirmed Mr. Benthham's surmise that *Sindora* and *Echinocalyx* are congeneric and led to his publishing in Hooker's *Icones Plantarum* a fuller account (*Icones Plantarum* xi. 11, t. 1017, 1018 [1867]) of the plants in question. The two plates, however, do not, as Mr. Benthham for the moment believed, represent the flowers and the fruit of one species. Plate 1018, representing the fruit of this composite species, being a figure of *Guilandina Wallichiana* Grah. can alone therefore be cited as *Sindora Wallichii* Benth. The plant figured on Plate 1017, being a different species, will have to be cited as *Sindora Echinocalyx*.

Mr. Baker has reduced to this already composite species two others that are equally distinct, viz. :—*S. siamensis* Teysm. and *S. intermedia* Bak. (as a variety); Mr. Baker has also established a valid new species (*S. velutina*). Still another species, which Mr. Baker seems for the moment to have overlooked, occurs in Cochinchina, while Mr. Baker has himself tentatively referred yet another to the genus *Azelia*.

The only modification that it is necessary to make in Mr. Baker's generic definition is to note that the pod is not necessarily armed with prickles on the face.

In the Key that follows, the opportunity has been taken of showing the relationship to one another of all the known species of *Sindora*; to the Key is appended a list of the citations that concern each. In drawing up the Key it has been somewhat difficult to present the species in a natural sequence, owing to the incompleteness of the specimens as regards particular characters. The stipules, for example, in *S. velutina* are unknown, so is the fruit; the flowers on the other hand are unknown both in *Sindora sumatrana* and *S. Galedupa*. The position of *S. velutina* in the Key and list may therefore be subject to revision when the missing parts are reported; the character of presence or absence of prickles on the calyx-lobes cannot be used satisfactorily.

Key to the known species of Sindora.

Pod armed on the face with strong straight prickles,
(unknown in *S. velutina*):—

Pods subegally rounded at base—the stipe and beak at
opposite ends of its long axis:—

Stipules large foliaceous ... 1. *S. Wallichiana*.

Stipules inconspicuous:—

Calyx lobes densely echinulate, leaflets small oval,

obtuse ... 2. *S. Echinocalyx*.

- Calyx with only a few spinules near tips of lobes;
 leaflets large obovate retuse ... 3. *S. siamensis*.
 Pods obliquely rounded at base—beak projecting later-
 ally at right angles to direction of stalk :—
 Stipules large foliaceous (calyx-lobes not echinulate ;
 pod under 1·5 in. ; leaflets 3-jugate) ... 4. *S. cochinchinensis*.
 Stipules inconspicuous :—
 Leaflets 3-jugate :—
 Pods under 1·5 in., leaflets glabrous, calyx un-
 known ... 5. *S. sumatrana*.
 Pods over 2·5 in., leaflets pubescent beneath,
 calyx echinulate ... 6. *S. intermedia*.
 Leaflets 5-jugate, calyx not echinulate ; pod unknown 7. *S. velutina*.
 Pod unarmed on the face (leaflets 4-jugate, glabrous ;
 stipe and beak at opposite ends of pod) :—
 Pod over 3 in. long ... 8. *S. coriacea*.
 Pod under 2 in. long ... 9. *S. Galedupa*.

1. *SINDORA WALLICHIANA* Benth. ex Prain, *Journ. As. Soc. Beng.* lxvi. 2. 203. *S. Wallichii* Benth. in Hook. *Icon. Plant. t.* 1018 (*in part and excluding t.* 1017) ; Bak. in *Flor. Brit. Ind.* ii. 268 (*exclud. the syn. Echinocalyx and both varieties*). *Guilandina Wallichiana* R. Grah. in *Wall. Cat.* 5805. *Galedupa Wallichiana*.

SINGAPORE ; Wallich 5805 ! T. Anderson 41 ! Kurz ! MALACCA ; Griffith !

The Griffithian specimens cited belonged to the collection of Dr. McClelland and are quite distinct from other Griffithian specimens issued as "*Dialium* sp." [K. D. 1848]. In the field Griffith referred the specimens to "*Cassia* ;" in Herb. Calcutta, however, Dr. T. Thomson has marked them "*Schotia* ! sp." which much more nearly indicates their true position.

2. *SINDORA ECHINOCALYX* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 204. *S. Wallichii* Benth. *Icon. Plant. t.* 1017 (*not t.* 1018 *and not Guilandina Wallichiana* R. Grah.) *Echinocalyx* Benth. in *Gen. Pl.* i. 584. *S. Wallichii* var. *ovalifolia* Maingay MSS. *Galedupa Echinocalyx*.

MALACCA ; Griffith 1848 ! Maingay 562/1 !

The inconspicuous stipules, smaller leaflets and very densely spinescent smaller calyx amply distinguish this from *S. Wallichiana*. It will be observed that in the field Dr. Maingay had already detected the difference between this plant and the original *Guilandina Wallichiana* ; it differs, however, the writer believes, more than merely varietally.

3. *SINDORA SIAMENSIS* Teysm. ex Miq. *Ann. Mus. Bot. Lugd.-Bat.* iii. 86 ; Kurz, *For. Flor. Brit. Burm.* i. 413. *S. Wallichii* var. *siamensis* Bak. in *Flor. Brit. Ind.* ii. 268. *Galedupa siamensis*.

SIAM ; at Rad-boerie, Teysmann 6050 !

This cannot possibly be reduced to *S. Wallichiana* ; it differs in leaves, and in flowers and to a less extent in fruit. Mr. Baker says it has leaves with 6 leaflets

but in almost every leaf on Teysmann's original examples there are 4 pairs of leaflets.

The native name is given by Teysmann as "May-sak."

4. *SINDORA COCHINCHINENSIS* Baill., *Adansonia* x. 104. *Grandiera cochinchinensis* Lefèvre MSS. ex Baill. *Galedupa cochinchinensis*.

COCHIN-CHINA; at Tay-ninh and Thy-daù-mot, Lefèvre.

The native name of this is given as "Caï-go;" it is said to be a fine tree 100 feet high.

5. *SINDORA SUMATRANA* Miq. *Flor. Ind. Bat. Suppl.* 288. *Galedupa sumatrana*.

SUMATRA; at Meranjat in Palembang, *Teymann* 3753! *MOLUCCAS*; Bawean, where it is grown in gardens, *Teymann* (Hort. Bog. 1766)!

Mr. Teysmann notes the Sumatra name for this as "Sindoor," but gives the name in Bawean as "Saparantu."

6. *SINDORA INTERMEDIA* Bak. in *Flor. Brit. Ind.* ii. 268 (as a VAR.); *Prain, Journ. As. Soc. Beng.* lxvi. 2. 204. *Sindora Wallichii Scortechini* MSS. not of Benth. *Galedupa intermedia*.

MALACCA; *Maingay* 562! PANGKORE; *Scortechini* 1064! *Curtis* 1630! PERAK; *Scortechini*!

Scortechini describes this as a tree 100 feet high. Curtis notes its native name as "Sapëtir" in Pangkore. The pods of this are obliquely rounded at the base so that the long axis of the pod is at right angles to the stalk; this alone makes it very easy to distinguish the species from *S. Wallichiana* and *S. Echinocalyx*.

7. *SINDORA VELUTINA* Bak. in *Flor. Brit. Ind.* ii. 269. *Galedupa velutina*.

MALACCA; *Maingay* 607!

The writer has seen a specimen kindly lent by the Director of the Royal Gardens, Kew, to the Superintendent, Royal Botanic Garden. It is clearly a very distinct species, nearest apparently to *S. cochinchinensis* and *S. intermedia*; its fruits have not, however, been yet reported, and its position in the key will depend on whether the long axis of the pod be found to be continuous with that of the stipe or at right angles to it.

8. *SINDORA CORIACEA* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 206. *Afzelia?* *coriacea* Bak. in *Flor. Brit. Ind.* ii. 275. *Intsia coriacea* *Maingay* MSS. *Galedupa coriacea*.

MALACCA; *Maingay*! *Ridley* 2328! PENANG; *Curtis* 430!

The Malacca name given by Mr. Ridley is "Sapëtir;" this is the name used in Pangkore for *S. intermedia*. In Penang the name used is "Mirbau," which is used on the Mainland for *Afzelia palembanica*.

This has exactly the pod of the other *Sindoras*, differing only from that of *S. Wallichiana* and *S. Echinocalyx* in being unarmed on the valves. From the next species it chiefly differs in the size of the fruits.

9. *SINDORA GALEDUPA* Prain. *Caju Galedupa* Rumph. in *Herb. Amboin.* ii. 59, t. 13. *Galedupa indica* Lamk. *Encyc. Meth.* ii. 594 (as to the citation *Galedupa* but excluding the plant described.) *S. sumatrana* var. *javanica* Koord. & Val. *Bijdr.* ii. 45 (possibly).

MALAYAN ARCHIPELAGO.

This species agrees with the preceding in number of leaflets and style of leaves as well as in having pods that are unarmed. It has smaller pods than any of the other species except *S. sumatrana*, from which it differs only in the absence of spines from the pods and in the long axis of the pod not being at right angles to the direction of the stalk. The reference of this plant by some writers to *Pongamia glabra*, in spite of its equally-pinnate leaves and its arillate funiculus, must be admitted to be incomprehensible.

The writer has examined a leaf specimen of *S. sumatrana* var. *javanica* Koord. & Val. The 4 pairs of leaflets suggest that it differs from *S. sumatrana*; the leaflets themselves seem to the writer to differ materially from those of *S. sumatrana* or indeed of any of the species represented in the Calcutta Herbarium. Neither flowers nor fruits are yet reported but it is highly probable that Messrs. Koorders and Valeton's plant either is an undescribed species, or—what would be even more interesting—is the long-lost *Galedupa* of Rumphius; the fact that its leaflets are in 4 pairs largely helps to strengthen the latter suggestion.

106. *DIALIUM* LINN.

1. *DIALIUM OVOIDEUM* Thw.

Add to localities of *F. B. I.*:—TRAVANCORE?; *Lawson*!

The specimens from Travancore seen by the writer consist of fruits only, and it is not absolutely certain that they belong to this species because they are decidedly gibbous at the base which those of the Ceylon plant at Calcutta are not. At the same time they much more closely resemble the fruits of *D. ovoideum* than they do those of *D. indum*, the true Malayan *Kranji*. They may possibly prove to belong to a lost species, *Dialium coromandelianum* Houtt., and it is to be hoped that members of the Society in Southern India will help to clear up the difficulty.

1b. *DIALIUM INDUM* Linn. *Mantiss.* i. 24; leaflets 5–9, all cuneate at the base, branches of the panicle ascending, pedicels shorter than the calyx, pod not velvety. *Benn. Pl. Jav. Rar.* 136, t. 30; *Miq. Flor. Ind. Bat.* i. 79; *Prain, Journ. As. Soc. Beng.* lxvi. 2. 169.

PAHANG; Pijai, *Ridley* 2627! PENANG; Ayer Etam, *Curtis*! **DISTRIB.** Malay Archipelago.

A tree 60–70 feet high, leaflets alternate, chartaceous, glabrous on both surfaces, finely reticulately-veined, 3–4 in. long, 1–1.5 in. wide, gradually narrowed from the middle to apex, base more abruptly cuneate. *Panicle* ample with slender finely grey-downy branches. *Buds* elliptic. *Sepals* ovate-obtuse, thinly grey-downy, 1 in. long. *Filament* much shorter than anther. *Pod* suborbicular slightly compressed, 9 in. across, dark-purple not velvety.

This is the earliest reported Asiatic species of the genus, and it has become usual to assign to it in particular the Malay name *Kranji*, first made known to us by Bontius. As a matter of fact, however, the name *Kranji* appears to be generic in its significance,

and to be applied to most, if not all the Malayan species of *Dialium*. Thus while, according to Bontius and Rheede, the name *Kranji* signifies *D. indum*, the field notes on specimens in Herb. Calcutta show that it may be applied to *D. laurinum* (Ridley 6437) to a form of *D. platysepalum* (Holmberg 821) to *D. Maingayi* (Curtis 440) and to what seems to be a form of *D. ambiguum* from Malacca (Derry 510 of 1892).*

According to Mr. Baker *D. indum* was not known from the Malay Peninsula up to 1878. Perhaps Mr. Ridley's Pahang specimens are from wild trees, his field-notes and his references in the account of the *Flora of Pahang*, (*Trans. Linn. Soc. n. s. vol. iii*) do not make the point clear. Mr. Curtis' Penang ones are pretty evidently from an introduced tree since they are noted as being from "Ayer Etam in Miller's compound" and since he gives besides two alternative Malay names, *Krangi Burong* and *Kranji Padie*. The latter term is not used for any other specimen at Calcutta, but the name *Kranji Burong* accompanies a Malacca form of *D. platysepalum* (Holmberg 855) with clavate pods. Another specimen for which alternative names are given is one of *D. Maingayi* (Goodenough 1533) from Malacca, which is cited as *Kranji ambot* or *Kranji s'kellat*. No other specimen has the name *Kranji ambot* but the name *Kranji s'kellat* is used (Derry 89; Goodenough 1693) for two Malacca gatherings of the round-fruited form of *D. platysepalum* with somewhat congested panicles. The name *Kranji papan* is used (Goodenough 1321) for *D. laurinum* but this name is also twice employed by the same collector (Goodenough 1225; 1553) for that form of the totally dissimilar *D. platysepalum* that has rather flattened pods.

It has been occasionally said that Malay native names are more exactly applied than is usual in India. The above will perhaps show that even within the limits of so marked a group of species as the various *Kranji* trees, the incidence of Malay names may be as vague and as unreliable as the incidence of Hindi names can be.

1c. *DIALIUM KUNSTLERI* Prain, *Journ. As. Soc. Beng.* lxi. 2. 168; leaflets 3-5, cuneate at base, pod very large umbonate at tip.

PERAK; Goping, *Kunstler* 4415!

A tree 100-130 feet high. *Leaflets* alternate or subopposite, ovate-lanceolate narrowly acuminate, apex entire, base cuneate, 4-5 in. long, 1.25-1.5 in. broad, coriaceous, rather dark-green shining above, dull and pale-green beneath, glabrous on both surfaces; petiolules short. *Panicles* terminal and axillary, 4 in. long. *Pod* subspherical, hardly compressed, oblique, prominently umbonate at tip, firm, 1.5 in. long, 1.35 in. wide, black. *Seed* solitary, subrotund, smooth, dark-brown, dull, .6 in. long, .5 in. wide, .2 in. thick. *Flowers* not seen.

2. *DIALIUM MAINGAYI* Bak.

Add to localities of *F. B. I.*:—PERAK; *Scortechini* 2052! *Wray* 3407! 3767! PENANG; *Curtis* 440! 3031! MALACCA; *Goodenough* 1533!

3. *DIALIUM LAURINUM* Bak.

Add to localities of *F. B. I.*:—SINGAPORE; *Krangi*, *Ridley* 6437! PAHANG; *Ridley*.

4. *DIALIUM PATENS* Bak.

Add to localities of *F. B. I.*:—PERAK; *Larut*, *Kunstler* 5551! 5577! *DISTRIB.* Borneo.

* Derry 510 of 1890 is not the same plant; it is undoubtedly a form of *D. platysepalum*; it bears the native name *Sepan*, not *Kranji*. This is an excellent instance of the undesirability of giving the same number to two different gatherings.

Substitute for description of fruit and seed in *F. B. I.*:—*Pod* ovoid slightly compressed, apex not apiculate, fragile, black with a thin grey pubescence, '5 in. long, '35 in. wide, '3 in. thick. *Seed* solitary, nearly regularly oblong with angles rounded, '3 in. long, '25 in. wide, '15 in. thick, dark-maroon, slightly shining, neither striate nor reticulate.

5. *DIALIUM PLATYSEPLUM* Bak.

Add to localities of *F. B. I.*:—PERAK; Larut, Wray! JOHORE; Machap, Goodenough!

5b. *DIALIUM AMBIGUUM* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 172; leaflets 7 opposite or subopposite, rounded at base, faintly puberulous beneath.

PERAK; Goping, *Kunstler* 6142! MALACCA; Derry!

A tree 40–50 feet high, leaflets oblong rather abruptly shortly caudate-acuminate, apex obtuse entire, 4–5 in. long, 1·5–1·75 in. wide, very rigidly coriaceous, bright-green glossy and glabrous above, dull and faintly puberulous beneath. Panicles terminal and axillary, deltoid, slightly spreading, 5–8 in. long, 4–8 in. wide, pedicels '15 in. long. *Calyx-tube* obsolete, '15 in. long, ovoid in bud, segments subequal much imbricate, reflexed after flowering, densely brown-velvety on both surfaces. *Pod* unknown.

A species very nearly related to *D. platysepalum* but differing in having a silky-grey instead of dark-brown ovary, and in having opposite leaflets which are only very faintly puberulous beneath.

6. *DIALIUM WALLICHII* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 174.
D. platysepalum VAR. *Wallichii* Bak. in *Flor. Brit. Ind.* ii. 270.

Besides differing in the points noted by Mr. Baker, *D. Wallichii* is unlike *D. platysepalum* in having the sepals glabrous within and the pod distinctly stipitate. It seems better therefore to treat it as specifically rather than as merely varietally distinct.

7. *DIALIUM KINGII* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 175; leaflets 13–15 opposite, oblong subobtuse or obtuse, branches of the very large panicle erecto-patent, pods velvety.

PERAK; Larut, *Kunstler* 4627! 8187!

A tree 100–150 feet high; leaflets opposite except the terminal one, oblong-lanceolate, apex abruptly cuneate or rounded with an obtuse or retuse tip, base cuneate or rounded, 2–2·5 in. long, '6–'8 in. wide, very rigidly coriaceous, deep-green glabrous and shining above, rusty-pubescent beneath. Panicles terminal and axillary, deltoid, 6–8 in. long, 8–10 in. across. *Calyx* ovoid in bud, tube obsolete, segments subequal broadly ovate-obtuse; externally densely brown-pubescent, internally waxy white, closely puberulous. *Pod* irregularly spherical, '9 in. long, '75 in. across, velvety-black. *Seed* solitary, subquadrate, warm-brown, faintly longitudinally striate, '4 in. long, '4 in. wide, '2 in. thick.

106.* KOOMPASSIA MAINGAY.

Very tall erect trees. *Leaves* odd-pinnate with alternate leaflets. *Flowers* copious small obscure, in ample terminal panicles, bracts small

caducous. *Calyx-tube* very short conical, or none; sepals 5 lanceolate subequal, very slightly imbricated. *Petals* 5 subequal, their margins not meeting. *Stamens* 5, filaments short or very short; anthers equal basifixed, dehiscing by two apical pores. *Ovary* sessile, subglobose or slightly elongated, 1-ovuled; style short acute, stigma small, terminal. *Pod* oblong, compressed, winged throughout its circumference, narrowed and somewhat twisted at the base, indehiscent. *Seed* solitary situated near the middle of the pod, compressed, exalbuminous; cotyledons leafy, radicle short straight. Species 4, Malayan.

1. *KOOMPASSIA MALACCENSIS* *Maingay* ex *Benth.* in *Hook. Ic. Pl.* t. 1164; leaflets 7-9 green, faintly adpressed rusty-puberulous beneath; panicles rusty-pubescent; petals rather larger than sepals and much exceeding stamens; anthers short, widely triangular; ovary subglobose, densely rusty-pubescent. *Taubert* in *Engl. Natürl. Pflanzenfam.* iii. 3. 156; *Prain, Journ. As. Soc. Beng.* lxxvi. 2. 166.

PERAK; *Kunstler!* Wray! *Scortechini!* MALACCA; *Maingay!* Derry! *Holmberg!* *Goodenough!* SINGAPORE; *Ridley!* PENANG; *Curtis!* DISTRICT, Sumatra.

A timber-tree 80-100 feet high, 3-4 feet in diam. *Leaves* 5-8 in. long; leaflets ovate-lanceolate or oblong-acuminate with obtuse slightly emarginate tip, coriaceous, 2-3 in. long, '8-1'25 in. wide. *Calyx-tube* obsolete, sepals ovate-acute, densely rusty externally. *Petals* oblong-obtuse, white, '15 in. long, slightly exceeding sepals, two and a half times as long as stamens. *Pod* oblong, compressed, 4-5 in. long, 1'25-1'5 in. wide, reticulately wide-veined opposite the seed. *Seed* solitary 1'5 in. long, '65 in. wide, cotyledons foliaceous, cordate, 5-nerved at base; nerves conspicuous.

This is the well-known Malay timber-tree known as *Kumpass*.

2. *KOOMPASSIA PARVIFOLIA* *Prain, Journ. As. Soc. Beng.* lxxvi. 2. 166; leaflets 9-11 glaucescent, closely pubescent beneath; panicles grey-silky; petals much shorter than sepals and stamens; anthers long, lanceolate; ovary subcompressed, nearly glabrous.

PERAK; *Goping, Scortechini!*

A timber-tree 80-100 feet high. *Leaves* 3-4 in. long, leaflets elliptic-lanceolate with obtuse slightly emarginate tip, chartaceous, 1-1'25 in. long, '25-'35 in. wide. *Calyx-tube* short conical, sepals ovate-lanceolate grey-silky externally. *Petals* elliptic, white, one-third as long as sepals, half as long as stamens. *Pod* not seen.

This is the timber-tree known to the Malays as *Tualang*; its wood is much used for building purposes.

108. CRUDIA SCHREB.

There are about 12 species of this genus in Malaya. The oldest name for the genus is *Touchiroa* Aubl.; this name applies, however, more particularly to those species (the original *Touchiroa aromatica*, also *Crudia bantamensis*, *C. gracilis* and *C. Wrayi*) that have only 3 or fewer than 3 leaflets; the remaining species form the group or section *Crudia* proper.

1. *CRUDIA ZEYLANICA* *Bth.*

2. *CRUDIA GLAUCA* Prain, *Journ. As. Soc. Beng.* lxi. 2. 221; leaflets papery 7-8, glaucous, glabrous on the nerves elsewhere puberulous beneath, petioles and innovations glabrous. *Touchiroa glauca* Prain MSS.

PERAK; Goping, *Kunstler* 8175!

A tree 50-70 feet high, stem 1·5-2·5 feet thick. *Leaflets* oblanceolate-oblong, base slightly obliquely rounded, apex rounded and abruptly obtusely cuspidate, 2·5-4 in. long, 1·25-1·75 in. wide, dark-green glabrous above, very glaucous beneath. *Racemes* dense. *Pod* oblong tapering at both ends, beaked, closely shortly puberulous, 4 in. long, 2 in. wide, ½ in. thick. *Seed* solitary, large oblong, 1·5 in. long, 1·2 in. across, ¼ in. thick.

Nearest of all the Malayan species to *C. zeylanica* Bth., the only Indian species described in the *F. B. I.*

3. *CRUDIA CURTISII* Prain, *Journ. As. Soc. Beng.* lxi. 2. 220; leaflets papery 7-9, uniformly puberulous beneath, petioles and innovations grey-pubescent. *Touchiroa Curtisii* Prain MSS.

PENANG; Govt. Hill, *Curtis* 3007! MALACCA; Bukit Sadanan, *Derry* 1164! PERAK; common, *Kunstler*!

A tall tree 80-150 feet high, stem 2-3 feet thick. *Leaflets* obovate to oblong, base slightly obliquely rounded or cuneate, apex rounded and abruptly obtusely cuspidate, 2-3·5 in. long, 1-1·5 in. wide, green glabrous above, grey-puberulous beneath. *Racemes* rather lax; pedicels slender, ½ in. long, buds oblong, ½ in. long. *Calyx-lobes* pubescent externally, glabrous within. *Pod* oblong obliquely rounded at base, subequally rounded apiculate at tip, closely shortly puberulous, 3 in. long, 2 in. wide, ½ in. thick.

VAR. ? *Wallichii* Prain, *Journ. As. Soc. Beng.* lxi. 2. 221; leaflets papery 7-9, uniformly densely softly velvety beneath, leaflets acute not cuspidate or caudate at apex. *Leguminosa* Wall. *Cat.* 5983. *Ignota* Wall. *Cat.* 8089. *Touchiroa Wallichii* Prain MSS.

PENANG; Porter! *Wallich*!

C. Curtisii is known in Malacca as "*Kumpas ruman*." The plant here tentatively treated as var. ? *Wallichii* will probably, when flowers are reported, turn out to be a distinct species.

4. *CRUDIA SPECIOSA* Prain, *Journ. As. Soc. Beng.* lxi. 2. 222; leaflets papery 5, rarely 3, quite glabrous on both surfaces, petiolules glabrous, innovations glabrescent. *Touchiroa speciosa* Prain MSS.

PUNGAH; "growing in the Rajah's Garden," *Curtis* 2955!

A handsome tree with slender pendulous glabrous branches. *Leaflets* oblong, base unequally rounded or truncate, apex abruptly tapering to a short acutely caudate tip, 2-2·5 in. long, 1-1·5 in. wide, dark-green above, paler beneath. *Racemes* rather dense; pedicels slender ½ in. long, glabrous as is the rachis, bracteolate below the middle. *Calyx-lobes* very sparsely puberulous externally, glabrous within. *Pod* not seen.

Nearest to *C. Curtisii* and *C. glauca*, but amply distinct from both.

5. *CRUDIA SCORTECHINII* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 220; leaflets papery, 11-13, uniformly tawny-puberulous beneath, petioles and innovations tawny-pubescent, pod rusty-tomentose. *Touchiroa Scortechinii* Prain MSS.

PERAK; Goping, *Scortechinii* 2029!

A tree 80-90 feet high. *Leaflets* lanceolate, base slightly unequally rounded, apex acuminate, 2-3 in. long, 1 in. wide, dark-green. *Racemes* rather lax, pedicels slender .4 in. long, tawny-pubescent like the angular rachis, bracteolate about the middle. *Calyx-lobes* sparsely-pubescent on both surfaces. *Pod* oblong, obliquely rounded at both ends, rugulose, 2.5 in. long, 1.5 in. across, flat. *Seed* 1 with a long funiculus.

6. *CRUDIA CAUDATA* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 219; leaflets coriaceous, 5-7, very long caudate-acuminate, leaf-rachis prolonged beyond ultimate leaflet, innovations and petioles densely rusty-pubescent. *Touchiroa caudata* Prain MSS.

JOHORE; Ridley 6399! *DISTRIB.* Borneo.

A small tree. *Leaflets* oblanceolate, base rounded or deltoid, 2.5-4 in. long, 1 in. wide, the narrow tip .75 in. long, dark-green shining above, dull and rusty-pubescent on the nerves beneath. *Calyx-lobes* densely rusty externally, glabrous within. *Pod* (young) linear oblong, obliquely rounded at base, obtuse apiculate at opposite end, compressed; 2 in. long, .75 in. wide, valves densely, shortly, subscabridly rusty-pubescent. *Seed* solitary.

An exceedingly distinct species.

7. *CRUDIA WRAYI* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 222; leaflets small 3, thinly papery, oblanceolate, racemes dense, rachis puberulous, flowers pedicelled. *Touchiroa Wrayi* Prain MSS.

PERAK; Sungei, Larut, *Wray* 2974!

A small tree with slender glabrous branches. *Leaflets* cuneate at base, rounded and shortly abruptly acuminate at apex, 1.5-2.5 in. long, .5-1 in. wide, quite glabrous on both surfaces. *Racemes* dense 4-8 in. long, rachis angular puberulous, pedicels slender .2 in. long, bracteolate in middle, buds .15 in. long. *Calyx-lobes* faintly puberulous externally. *Pod* unknown.

A member of the group of species to which the original species *Touchiroa aromatica* belongs, which is further represented in the east by the species *C. bantamensis* and *C. gracilis*. It is easily distinguished from all three by its much smaller leaves, and is further distinguished from the two Malayan species by its longer pedicels; from the American species it is distinguished by its larger racemes.

8. *CRUDIA GRACILIS* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 223; leaflets large 3, firmly papery, ovate-oblong to oblong-lanceolate, spikes slender sparse strict, rachis glabrous. *Touchiroa gracilis* Prain MSS.

PERAK; Thaiping, "in low wet ground in dense forest, rare," *Kunstler* 8468!

A slender shrub 6-8 feet high, young branches glabrous. *Leaflets* cuneate or slightly unequally rounded at base, shortly caudate-acuminate at apex, glabrous on

both surfaces, 4·5-6 in. long, 2-3 in. across. *Flowers* sessile, buds oblong, '15 in. long. *Calyx-lobes* quite glabrous on both sides. *Pod* not seen.

This is the nearest, of the Peninsular species, to *C. bantamensis* (Touchiroa bantamensis Hassk.) from Bantam. It differs in having quite sessile glabrous flowers and a sparsely flowered, glabrous rachis.

109. SARACA LINN.

1. SARACA INDICA Linn.

After a prolonged study of the material in the Calcutta Herbarium, the writer can find no evidence that *Saraca indica* extends, as a wild species, to the east of the Irrawaddy. There are no specimens here from the Malay Peninsula, and those seen by Mr. Baker from Malacca must in all probability have been from planted trees. In Canara occurs a variety (VAR. *puberula*) with peduncles, pedicels, leaf-rachis, and petiolar aspect of stipules all puberulous to pubescent; Chittagong and Arracan specimens always have very much broader and larger leaflets than the normal plant though they are, like it, everywhere glabrous; they seem to constitute a distinguishable variety (VAR. *latifolia*). *S. minor* and *S. Zollingeriana* are probably best treated as distinct species.

1b. SARACA ZOLLINGERIANA Miq. *Flor. Ind. Bat.* i. 84; leaflets 6, petiolules short, bracteoles persistent ascending, sepals not half as long as calyx-tube, stamens 7. *S. indica* Wall. *Cat.* 5822 (*F* only) not of Linn.

MARTABAN; Wallich! DISTRIB.; Java.

A low erect tree. *Leaves* sessile or subsessile, lanceolate-oblong or lanceolate-acuminate to an obtuse tip, 6-8 in. long, 1·5-2 in. wide, less rigid than in *S. indica*. *Corymbs* dense 2-3 in. broad, pedicels glabrous very slender, '25 in. long below the small ovate acute ascending bracteoles. *Sepals* '2 in. long, orbicular, under one-third the length of calyx-tube. *Filaments* 3 times as long as the sepals, anthers much smaller than in *S. indica*. *Pod* as in *S. indica*.

Dr. King has noted of the plants of this species cultivated in *Hort Calcutta*, received from Java:—"Differs from *S. indica* in having only 3 pairs of leaflets, "in having narrower sepals, in flowering later, and in having the smell of ripening "pears."

1c. SARACA MINOR Miq. *Flor. Ind. Bat.* i. 84; leaflets 2-6, petiolules short, bracteoles persistent spreading, sepals half as long as calyx-tube, stamens 8.

VAR. *typica*; leaflets 6; bracteoles acuminate. JAVA.

VAR. *bijuga*; leaflets 4 or very often only 2, bracteoles obtuse. *S. bijuga* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 214.

PERAK; very common.

A tree 30-40 feet high. *Leaves* sessile, leaflets oblong-lanceolate acute, 10 in. long, 2·5 in. wide; in texture much thinner than those of *S. indica*. *Corymbs* rather lax, 4 in. long, 3 in. wide, pedicels very slender glabrous, '5-'75 in. long below the large spreading oblong, obtuse bracteoles. *Sepals* '35 in., obovate-oblong. *Filaments* 3 times as long as sepals, anthers very small. *Pod* smooth, reddish-yellow, 8-10 in. long, 2·5 in. wide, obliquely cuneate at base, obliquely acute at apex.

This description applies only to the Perak plant which might perhaps with equal propriety be considered a distinct species, *Saraca bijuga*. Among Malayan species it most closely resembles *S. triandra* Baker, which also is very common in Perak and also as a rule has 2-jugate leaflets. But it is at once distinguished in flower by its glabrous peduncles and pedicels and its 8 stamens, and in fruit by its smoother larger pods not so oblique at the base or so obtuse at the tip.

2. *SARACA CAULIFLORA* Bak.

Add to description of *F. B. I.*:—Pod 12 in. long, 2 in. wide, with a stout beak .75 in. long.

Add to localities:—PERAK; *Scortechini*!

This appears to be rather a rare species in the Peninsula. There are 2 lanceolate bracteoles .35 in. long, but they are extremely deciduous; the bracts, which are also very deciduous, are large oblong, 1 in. long.

2b. *SARACA DECLINATA* Miq. *Flor. Ind. Bat.* i. 84; leaflets 12–16 (usually 14), petiolules long, bracteoles deciduous, corymbs rather dense, usually from thick old branches, sepals less than half as long as the calyx-tube, stamens 4. *Jonesia declinata* Jack. in *Malay. Miscell.* ii. 7. 74; *Walp. Rep.* i. 844.

PERAK; very common. PAHANG; *Ridley*! SELANGOR; *Curtis*! MALACCA; *Goodenough*! *Ridley*! DISTRIB. Sumatra; Java.

Extremely like *S. cauliflora* Baker, and when in flower only to be satisfactorily distinguished by analysis. Still the writer believes Mr. Baker's species to be, as species go in *Saraca*, a fairly separable one; not only is the character of 4 stamens always associated with shorter sepals, the pods are also distinguishable. Those of *S. declinata* are usually rather longer than those of *S. cauliflora*, being often 15 in. long; they never appear to be beaked as those of *S. cauliflora* are.

2c. *SARACA THAIPINGENSIS* Cantley ex Prain, *Journ. As. Soc. Beng.* lxvi. 2. 211; leaflets 14–16, petiolules long, bracteoles deciduous, corymbs very short dense and subsimple from thick old branches, sepals nearly as long as calyx-tube, stamens 4.

PERAK; very common. MALACCA; *Derry*!

This again in foliage and habit very closely resembles the two preceding species, but may be separated by its shorter denser corymbs on which many of the lower bracts persist for a considerably longer time; by the larger flowers, with much longer sepals, and by the much broader pods. In the two preceding species the pods are 2 in. across; in this they are always over 3 in. wide, and are besides rather thinner in texture. The corymbs are not over 3 in. across; the stamens appear to be always 4 only.

3. *SARACA LOBBIANA* Bak.

Add to description:—Pod 12 in. long, 2.25 in. wide.

The pod is almost exactly like that of *S. declinata* in shape, i.e., it has not got a persistent beak; in size it is more like that of *S. cauliflora*. It differs, however, from both in having a longer stipe, 1.25 in. in length. In none of the flowers examined by the writer have more than 6 stamens been found, in a few of the flowers only 5 are present.

There is a species from Borneo as yet undescribed that approaches this very closely but that differs in having shorter racemes (springing in the same way from slender leafless branches), flowers with persistent bracteoles, only 4 stamens, and a more shortly stipitate pod. It has been distributed by Mr. Haviland with the mark *d. u. e. d.*; being one of Haviland's plants, the writer is precluded from describing it.

3b. *SARACA KUNSTLERI* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 213; leaflets 4-6, petiolules long, bracteoles caducous, corymbs in very long sparse terminal panicles, sepals about as long as calyx-tube, stamens 7.

PERAK; Gunong Batu Pateh, 1500-2000 feet, *Kunstler* 8048!

Tree 20-40 feet high; branchlets zigzag glabrous. *Leaf-rachis* 5-10 in. long, glabrous, leaflets large diminishing downwards, ovate-acuminate base cuneate, distal 8-10 in. long, 3.5-4 in. wide, basal if 2 pairs and central if 3 pairs 4-5 in. long, 2.25-2.5 in. wide, basal if 3 pairs 3.5-4 in. long, 2-2.25 in. wide; all papery glabrous on both surfaces, dark-green above paler beneath, main-nerves 6-9 pairs ascending, more prominent beneath. *Peduncles* glabrous 8-12 in. long, branches 1-2 in. long. *Pedicels* and calyx-tube very short, calyx-lobes ovate-oblong .2 in. long, glabrous. *Filaments* 7, anthers not seen. *Pod* falcate 4-6 in. long, 1.5 in. wide, glabrous. *Seeds* 5-6 transversely ovate, .5 in. long, .7 in. across, .25 in. thick, testa black, smooth shining crustaceous.

A very distinct species apparently nearest *S. Lobbiana* Baker. Unfortunately good flowers are not available for description.

3c. *SARACA GRIFFITHIANA* Prain; leaflets 8-12, petiolules short, bracteoles persistent ascending, sepals about half as long as calyx-tube, stamens 4, rarely 5 or 3.

UPPER BURMA; Poneline, *J. Anderson*!

A low tree. *Leaves* sessile or subsessile; leaflets oblong-lanceolate acute, 6-8 in. long, 1.5-2 in. wide, subcoriaceous. *Corymbs* dense 3-4 in. broad; pedicels stoutish .25-.35 in. long, pubescent as are the peduncles; bracteoles small acute ascending amplexicaul. *Sepals* .25-.3 in. long, obovate-oblong. *Filaments* three times as long as the sepals. *Pod* not seen.

This species has been long known in the Calcutta Herbarium where it is marked "*Saraca* species in H. B. C. from Griffith's collections." Most probably therefore they had been obtained from plants raised from seeds brought by Dr. Griffith from his Ava journey, as it is only from Upper Burma that specimens have since been received.

The facies of the plant is that of typical *S. indica* but the peduncles and pedicels are pubescent as in *S. palembanica* and *S. triandra* and in *S. indica* var. *puberula*; the bracteoles too are here very much smaller, as in *S. Zollingeriana*; the stamens moreover are almost always 4, in several flowers 3 have been found, in one flower 5. With *S. Zollingeriana* it agrees in consistence of leaves and as to bracteoles, but it differs in having the pedicels pubescent and in not having 8 stamens. The species it most nearly resembles is *S. palembanica* but while it agrees in foliage, pubescence and number of stamens with that species, it has much larger anthers and stouter pedicels, and has altogether different bracteoles as well as a much larger calyx.

3c. *SARACA MACROPTERA* *Miq. Flor. Ind. Bat.* i. 1080; leaflets 8-12, petiolules short, bracteoles spreading persistent, peduncles and pedicels quite glabrous, stamens 4.

VAR. *typica*; leaflets cuneate at base, corymbs lax, 3-4 in. long and broad.

SUMATRA; BORNEO.

VAR. *parviflora*; leaflets truncate at base, corymbs dense, 1 in. long, usually in rings on thick old branches, flowers much smaller than in

VAR. *typica*.

PERAK; *Kunstler*!

A tree 30-40 feet high, stem 4-6 in. thick. *Leaflets* lanceolate acute 6-10 in. long, 1.5-2.5 in. across. *Corymbs* densely clustered, bracts persistent spreading or reflexed; bracteoles obovate, .2 in. long, spreading. *Sepals* .15 in. long. *Filaments* three times as long as sepals, anthers very small. *Pod* not seen.

This comes nearest a Bornean species (*S. Hullettii*) of which a description is appended.*

3d. *SARACA PALEMBANICA* *Miq. Flor. Ind. Bat. Suppl.* 291; leaflets 10-14, petiolules short, bracteoles spreading persistent, stamens 4; peduncles and pedicels pubescent.

PERAK; *Scortechini*! PENANG; *Curtis* 647! 1386! DINDINGS; *Bryant*! *DISTRIB.* Sumatra.

A slender tree. *Leaflets* oblong-lanceolate acute, 8-12 in. long. *Corymbs* sessile from old nodes on thick old branches, dense, 2-3 in. long, bracts persistent spreading. *Flowers* as in *S. triandra*. *Pod* not seen.

Except in the shape of the more numerous leaflets, and in the denser shorter corymbs, this species does not appear to the writer to differ specifically from *S. triandra*, an opinion which, judging from a note left by him in Herb. Calcutta, the late Father Scortechini appears to have been inclined to entertain.

4. *SARACA TRIANDRA* *Bak.*

Add to description of *F. B. I.*:—Peduncles and pedicels pubescent.

* *SARACA HULLETTII* *Prain*; leaflets 4-6, petiolules distinct, bracteoles large spreading or reflexed, persistent, sepals longer than the calyx-tube, stamens 4.

BORNEO; Sarawak, planted, *Hullett* 312! near Kuching, *Haviland*!

A tree. *Petiolules* .25 in. long; *leaflets* thin shining on both surfaces, ovate to ovate-lanceolate acute, corymbs short-peduncled, peduncles and pedicels quite glabrous, 3-4 in. long and broad. *Bracts* persistent spreading or reflexed; bracteoles ovate .25 in. long. *Sepals* .25 in., calyx-tube .2 in. *Filaments* 3-4 times as long as sepals. *Pod* oblong very oblique at both ends, 3 in. long, 1.5 in. wide, distinctly beaked; stipe slender .5 in. long.

With this appears to agree *Beccari*, P. B. 916, of which there are, however, only flowers from Calcutta. The species is evidently very closely related to *S. macroptera*, of which it has quite the flowers; the leaves with fewer shining leaflets are, however, very different from those of *S. macroptera*. To avoid the possibility of future confusion of the two species this diagnosis is given.

This species is extremely common in Perak as well as in Malacca. It has also been once obtained in the Dindings (by *Bryant*), and once in Penang (by *Curtis*, n. 163!). There is besides a specimen at Calcutta from Sumatra (*Teysmann* 3638!), named "*Jonesia palembanica* var.?" which, while not precisely Miquel's *J. palembanica*, is not distinguishable from Mr. Baker's species; it may be necessary hereafter in monographing *Saraca* to treat *S. triandra* as only a variety of *S. palembanica*.

The synonym *Jonesia triandra* Roxb. must be deleted, for Roxburgh's *Jonesia triandra* is *Azelia bijuga*. And, though it is not at all clear what *Jonesia scandens* Roxb. may have been, there is every reason to believe that it too belongs to some other genus. The fact that it was 'scandent,' for Roxburgh having said so enables that to be taken for granted, most certainly precludes its citation under *S. declinata* as Miquel, or under *S. triandra*, as Baker would suggest.

5. *SARACA LATISTIPULATA* Prain, *Journ. As. Soc. Beng.* lxi. 2. 217; leaflets 12, *stipellate*, short-petioluled, bracteoles ascending amplexicaul persistent, stamens 2; stipules large, foliaceous, only connate at their bases between the petiole and the stem.

PERAK; *Ridley*!

Petiolules 15 in., twice as long as the subulate firm persistent stipels; leaflets very firmly coriaceous, ovate-lanceolate acute or acuminate, bases almost equally rounded, 5 in. long, 1.5 in. wide, dark-green dull glabrous above, finely puberulous on the midrib beneath as also on the margins, the petiolules, leaf-rachis and stipels; stipules foliaceous sometimes 1.5 in. long, each with bold midrib, obliquely cordate, the outer free margin of each auriculate, the inner margins cuneate and connate throughout their lower third between petiole and stem. *Corymbs* very few-flowered (sometimes flowers subsolitary), clustered on warted nodes along thick branches hardly .75 in. long; pedicels puberulous; bracts persistent, bracteoles triangular puberulous. *Sepals* under .25 in. long. *Filaments* about twice as long as sepals. *Pod* oblong, 2 in. long, .8 in. wide.

A most remarkable species, which deserves perhaps to be treated as the type of a distinct section.

112. HUMBOLDTIA VAHL.

5. *HUMBOLDTIA DECURRENS* Bedd. ex Oliv. in *Hook. Ic. Plant.* xxiv. t. 2368; branches hollow, nodes constricted, spur of stipule large ovate subacute, leaves distinctly petioled, *rachis winged*, leaflets 8-12, petiolules 0; petals 5.

S. INDIA; Travancore, *Beddome*, *Bourdillon*!

A tree 40-50 feet high, trunk 1 foot in diam., branchlets cinnamon-brown tomentose. *Stipules* obliquely lanceolate or ovate-lanceolate, 1.5-2.5 in. long, below the point of attachment obliquely ovate or reniform, leaf-rachis a foot long, leaflets elongate-lanceolate, 6-15 in. long, the lower shorter than the others, thinly coriaceous, base obtuse, apex acuminate. *Racemes* short axillary, solitary or paired, often hardly exceeding the stipules, bracteoles and sepals downy on the back, the latter .5 in. long. *Petals* oblanceolate or oval, as long as the sepals. *Pod* 3.5-5 in. long, 1-1.5 in. wide near the tip, tomentose.

This is at once distinguished from other species of *Humboldtia* by its alate rachis.

113. AFZELIA SMITH.

1. AFZELIA RETUSA Kurz.

Add to localities of *F. B. I.*:—BENGAL; Sundribuns, Ellis!

This has often a branched inflorescence and often also has acute leaflets, so that the only character left to distinguish it from *A. bijuga* is the absence of pubescence from its pedicels and calyx. It might be as well to treat it as only a variety of *A. bijuga*.

2. AFZELIA BIJUGA A. Gray.

Add to synonyms of *F. B. I.*:—*Jonesia triandra* Roxb. *Flor. Ind.*
ii. 220.

3. AFZELIA PALEMBANICA Bak.

The synonym *Intsia palembanica* Miq. must be deleted because Miquel's plant, though near this, has very different, much larger bracts. It will be necessary for whoever may monograph the genus *Afzelia* to re-name this species *A. Bakeri*.

4. AFZELIA ? CORIACEA is a *Sindora*.

113b. PAHUDIA MIQ.

Erect unarmed trees. *Leaves* abruptly pinnate with few pairs of opposite leaflets. *Flowers* racemose in sessile or peduncled terminal panicles. *Calyx* with a disc produced to the top of its somewhat elongated tube; sepals 4 much imbricated slightly unequal. Developed *petal* one, orbicular, short-clawed, the lower ones rudimentary or wanting. *Stamens* 7 declinate united high up into a slit sheath, the filaments unequal and free at the summit, and with 2 small staminodes at the base of the staminal tube; anthers small oblong dehiscing longitudinally. *Ovary* stalked few-ovuled, style filiform with a small terminal stigma. *Pod* large oblong, thick and woody, 2-valved, dehiscing, smooth. *Seeds* with a large basal arillate funiculus. Species 2, one Malayan, one Indo-Chinese.

1. PAHUDIA XYLOCARPA Kurz in *For. Flor. Brit. Burm.* i. 413.

SHAN HILLS; Dr. King's Collector 134! *DISTRIB.* Siam.

A tree with puberulous and pruinose branchlets. *Leaves* short-petioled, leaflets 2-3-paired, with distinct petiolules, ovate, rounded at base, slightly acuminate at tip, thinly papery, glabrous shining above, glaucescent beneath, 3-3.5 in. long. *Flowers* in a grey-pubescent terminal panicle, the individual racemes few-fl'd.; pedicels short thick; sepals grey-velvety obovate, concave, the outer pair about .25 in., the inner pair .2 in. long. *Pods* rhomboid oblong, thick-valved and somewhat turgid, 4-5 in. long. *Seeds* 2, compressed, orbicular, enclosed in a medullary endocarp, about 1.25 in. across, resting on a horny, arillate, much expanded funiculus.

A very interesting addition to the Burmese Flora. The species was first collected in Siam by Mr. Teysmann, and has recently been sent from the southern Shan Hills by one of the collectors of the Calcutta Botanic Garden.

114. BAUHINIA LINN.

1. BAUHINIA TOMENTOSA *Linn.*

Also in the Andamans, but possibly introduced.

2. BAUHINIA BRACHYCARPA *Wall.*

This still remains a doubtful plant. There is no example of *Wall. Cat.* 5786 at Calcutta, and the sheets here named *B. brachycarpa* by Dr. Wallich himself have been reduced by Mr. Kurz to *B. acuminata*; in making this reduction Mr. Kurz is certainly right.

3. BAUHINIA POLYCARPA *Wall.*

Add to description of *F. B. I.* :—*Petals* white, .35 in. long.

All dubiety has now been removed from this plant which is a very distinct species and has been recently reported from Makana in Tenasserim, at 2000 feet elev., and from many localities in the Shan Hills.

Its nearest ally is evidently *B. timorana* Decaisne (*Nouv. Ann. Mus.* iii. 446) which, apparently by a *lapsus calami*, has been written *B. timoriensis* and reduced to *B. racemosa* in the *F. B. I.* and again in the *Index Kewensis*. A perusal of Decaisne's description shows that his plant has little in common with *B. racemosa* beyond that both are *Bauhinias*. Decaisne gives no collector's name and no exact locality in Timor. There are, however, examples in Herb. Calcutta of a species collected at Coepang in Timor by R. Brown in 1803 which agree exactly with Decaisne's description. Brown's plant is extremely closely related to *B. polycarpa*, its somewhat different bracts and denser racemes alone satisfactorily distinguishing it from Dr. Wallich's plant; it does not, supposing it to be *B. timorana*, in any way recall or resemble *B. racemosa*.

VAR. *Kurzii* Prain; leaves larger, 6 in. long, 8 in. across; pods rather longer (3.5 in.) and broader (.5 in.); seeds about 10.

PEGU; Yomah, in high teak forest, *Kurz* 1783 *bis*!

This Mr. Kurz at first attributed to *B. acuminata*; its leaves much resemble those of that species but its pods are extremely unlike and resemble, on a larger scale, those of *B. polycarpa* to which Mr. Kurz has finally referred it. It appears to the writer highly probable that it will turn out, when more fully represented, to be a distinct species.

6. BAUHINIA MALABARICA *Roxb.*

The leaves of this species are not deeply bifid in any Calcutta specimen. *Bauhinia acida* Reinw. (*Flora* xxxi. 578) does not differ even as a variety. This species extends as far south as Tenasserim in the Eastern Peninsula, but has not as yet been reported from the Andamans or from the Malay Peninsula; it recurs, however, in Java and in Timor.

7/1. BAUHINIA TORTUOSA *Coll. & Hemsl. Journ. Linn. Soc.* xxviii. 52, t. 8; erect or semi-scandent, leaves 7-9-nerved, slightly cordate, shallowly bifid, flowers in small dense lateral racemes, bracts small, linear, pedicels a little longer than calyx, calyx-limb with broadly ovate lobes; style very short or 0.

UPPER BURMA; Koni, *Collett* 561! *Prazer*! Shan Hills; *King's Collectors*!

A small tree or subscandent bush. *Leaves* shortly petioled subcoriaceous, shortly bilobed, lobes slightly angular at the apex, base cordate-rounded, broader than long, 1·5–2 in. across, glabrous above, tomentose beneath, the nerves rusty as are the petioles, the tomentum mixed with pellucid glands; petioles 3–4·5 in. long. *Racemes* small dense 75–125 in. long; flowers 5 in. across, pedicels rusty-tomentose 2 in. long, bracts 1 in. long. *Calyx-lobes* rusty externally, broadly ovate-obtuse, spreading. *Petals* subequal obovate-spathulate one-third longer than calyx-limb, white. *Stamens* 10 perfect, alternately short and long. *Ovary* subsessile, densely villous, 2–3-ovuled, style almost absent. *Pod* dehiscent with woody valves, subfalcate, narrowed gradually to base, apex obliquely acute, 2 in. long, 4 in. wide, glabrous and brown externally, rufous-tomentose within except opposite the 1–3 seeds, ovate, compressed, 35 in. long, 25 in. across, their long axis set obliquely backwards across the pod; testa smooth, shining, reddish-brown.

Near *B. malabarica* Roxb., *B. Faberi* Oliv., and the next species.

7/2. *BAUHINIA ENIGMATICA* Prain; erect, leaves 11–13-nerved, slightly cordate, shallowly bifid, flowers in small rather lax lateral corymbs, bracts subulate, pedicels much longer than calyx, calyx-limb with broadly triangular lobes; style very short or none.

UPPER BURMA; Maymyo, *King's Collector*! Shan Hills at Fort Stedman, *King's Collectors*!

A small tree. *Leaves* shortly petioled, subcoriaceous, shortly 2-lobed, lobes rounded, sinus wide, base cordate-rounded, broader than long, 4 in. across, glabrous above, faintly puberulous beneath and pellucidly gland-dotted, petioles 75–1 in. long. *Racemes* corymbose 1·5–2 in. long; flowers 75 in. across, pedicels puberulous very slender the lowest 5–6 in. long, bracts puberulous 25 in. long, subulate. *Calyx-lobes* puberulous, broadly ovate-acute, spreading. *Petals* subequal oblanceolate-acute, twice as long as calyx-limb, pale-yellow or white. *Stamens* 10, perfect subequal. *Ovary* sessile, small, densely villous, 1-ovuled, style 0. *Pod* not seen.

At first the writer was inclined to consider this only a large leafed form of *B. tortuosa* to which it is obviously closely related, but the longer more slender pedicels, longer bracts, acute calyx-lobes and narrow pointed petals as well as the solitary ovules, forbid this treatment.

8. *BAUHINIA FOVEOLATA* Dalz.

Recently collected specimens from Canara, sent by Mr. Talbot, are all diæcious. They do not in any other respect appear to differ from *B. Lawii* Benth. which name should therefore be sunk.

11. *BAUHINIA CORNIFOLIA* Bak.

Add to localities of *F. B. I.*:—MALACCA; *Maingay* 545! PERAK; *Kunstler* 6261!

Add to description:—*Pod* oblong, woody, 4 in. long, 2 in. wide, externally finely adpressed rusty-pubescent; seeds about 4, much compressed, 1 in. long, 7 in. across.

This species is extremely closely related to *B. bidentata* and differs chiefly in having larger flowers, leaves slightly pubescent beneath, and glabrescent pods. The character to be derived from the apex of the leaf, which is relied upon in separating species 11, 12 and 13 of the *F. B. I.* from species 14, 15 and 16 of that work, is not to

be absolutely depended upon; in the three first, as the very large suites of specimens in Herb. Calcutta show, the leaves are often bifid, in the three last they are as often entire at the tip.

12. *BAUHINIA FINLAYSONIANA* *Grah.*

PENANG; *Curtis* 295! PERAK; *Kunstler* 3589! *Scortechini* 247! 1463! *Wray* 2300!

Pods small black glabrous linear-oblong, 2 in. long, '6 in. across.

Bauhinia Kockiana Reinw. (*Verh. Nat. Geschied.* 87, t. 10) is very closely related to this species and to *B. cornifolia* but is quite distinct from both. It resembles *B. Finlaysoniana* in leaf and in pod, but differs in having a much longer calyx-tube, as in *B. cornifolia*; its pods and foliage, however, are quite unlike those of the latter species.

13. *BAUHINIA LUCIDA* *Wall. Cat.* 5779 A.

The *F. B. I.* has identified this with *Bauhinia emarginata* Jack, from Sumatra. Dr. Wallich's original note reads as follows:—" *Bauhinia emarginata* Jack, in Malay Miscel. App. 6. 75? Perhaps different by its long racemes which may render it a new species (*B. lucida* Wall.)"

Jack's plant, by the original description, has more nerves (7-9) than the present plant which has 5-7 only, has long pedicels, and has tomentose ovaries; it is therefore clear that the Sumatra plant in question is distinct from the present one. In any case the use of the name *B. emarginata* should be avoided since it was already employed for a Mexican species (*B. emarginata* Mill. *Dict.* ed. viii. n. 5) when Jack's description was published.

Mr. Baker suggests that this may be *B. cordifolia* Roxb. and is not alone in this belief, for specimens from Hort. Bogor. show that *B. lucida* is, or was, in cultivation there under the name *B. cordifolia*. But Roxburgh's description, though perhaps too meagre to enable us to identify his plant, is sufficient to exclude the present one, since *B. cordifolia* is described as being smooth in every part.

13/1. *BAUHINIA WRAYI* *Prain, Journ. As. Soc. Beng.* lxi. 2. 191; leaf rather longer than broad, gradually acutely pointed, calyx very small, limb as long as tube, petals broadly oblanceolate margin crenulate-sinuate distinctly clawed.

PERAK; *Kunstler*! *Scortechini*! *Wray*! SELANGOR; *Kunstler*!

A shrubby cirrhose climber 15-30 feet long. *Leaves* flexible glabrous above, glaucous and sometimes sparsely pubescent on nerves beneath, 2-3 in. long, 1'25-1'75 in. across, 5-nerved, base truncate, petiole '5-'6 in. long. *Flowers* in dense close-fld. terminal and axillary racemes 2'5-4 in. long, 2'5 in. across; pedicels spreading, 1'25 in. long, sparsely puberulous. *Calyx* glabrous, tube very slender cylindric '1 in. long, lobes '1 in. long spatulate. *Petals* pale-yellow or white becoming pinkish, '6 in. long, externally pubescent. *Ovary* glabrous stalked, style distinct. *Pod* obovate to oblong-obtuse, stalk '2 in. long, 2-3 in. long, 1 in. across. *Seeds* 1-2, rarely 3, broadly ovate much flattened, '5 in. long, '4 in. across.

A very distinct species apparently connecting the sections *Phanera* and *Lasiobema*. It cannot be confounded with any other Indian species but comes extremely near a Bornean plant (*Mottley* 376; *Haviland* 95) which differs in having cordate leaves, larger almost glabrous though similarly crenulated petals and quite

glabrous pedicels. It is not impossible that the Borneo plant may be the true *B. cordifolia* Roxb., which came originally from the Moluccas.

14. *BAUHINIA RETUSA* Ham.

Add to localities of *F. B. I.*:—NEPAL; *Maries!* CHOTA NAGPUR; very common, *T. Thomson!* *Kurz!* *Gamble!* *Wood!* *C. B. Clarke!* *Prain!*

15. *BAUHINIA INTEGRIFOLIA* Roxb.

Add to localities of *F. B. I.*:—PERAK; Prov. WELLESLEY and PAHANG, very common. DISTRIB. Sumatra.

16. *BAUHINIA BIDENTATA* Jack.

Add to description of *F. B. I.*:—*Pod* oblong woody, 4-5 in. long, 1.5 in. wide, externally quite glabrous, stipe .25 in. long. *Seeds* 4-5, much compressed, .5 in. long, .35 in. wide.

Add to localities:—PERAK; common. SELANGOR; *Ridley!* JOHORE; *King!* *Hullett!* DISTRIB. Sumatra.

The Malacca specimens referred here in the *F. B. I.* agree with *B. cornifolia* Bak. except in having bifid leaves with an extra pair of nerves; they have therefore been referred to that species rather than to *B. bidentata* from which their pubescent pods alone suffice to exclude them.

16/1. *BAUHINIA KINGII* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 189; scandent, cirrhose, pubescence ferrugineous, calyx-tube equalling the limb, ovary silky along the sutures, long stalked.

PERAK; *Scortechini!* *Wray!* SELANGOR; *Kelsall!* DISTRIB. Borneo?

Leaves deeply cordate, often slightly subpeltate, narrowed gradually to an emarginate rarely entire often deeply 2-fid tip; nerves 5, pubescent beneath branching outwards; rigidly coriaceous, 3.5-4 in. long, 2.5-3 in. wide; shining above. *Flowers* in lax lateral and terminal corymbs 3 in. long, 2.5 in. wide, sometimes forming large loose leafy zigzag panicles 6 in. across, often over a foot long. *Buds* pubescent; pedicels puberulous, the longest 1.25 in., spreading. *Calyx*-limb splitting into subequal ovate very shortly acuminate lobes, .25 in. long, .2 in. across; tube narrowly infundibuliform, .25 in. long. *Petals* subequal, bright-red (*Wray*), oblanceolate-obtuse, long-clawed, .8 in. long, .25 in. wide, externally rusty-pubescent. *Ovary* pubescent along sutures, stalk ultimately .2 in. long, style .25 in. long, curved, pubescent. *Pod* woody glabrous tapering to both ends, 2 in. long, .8 in. wide. *Seeds* 1-2, ovate, compressed, .3 in. long, .2 in. across.

A very distinct species. *Beccari* n. 835, from Borneo, is perhaps the same.

16/2. *BAUHINIA SCORTECHINII* Prain, *Journ. As. Soc. Beng.* lxvi. 2. 188; leaf rather longer than broad, suddenly tapering in upper third to a deeply 2-fid tip; calyx-limb as long as tube; *leaves densely-pubescent beneath.*

PERAK; *Scortechini!*

A cirrhose twiner with glabrescent branches. *Leaves* rigidly coriaceous, 3.5-4 in. long, 2-2.5 in. wide, 9- (rarely 7-) nerved, shallowly cordate or truncate. *Flowers* in short lax terminal racemes under 2 in. long, pedicels erecto-patent, lower not exceed-

ing .5 in., densely brown-tomentose like the calyx. *Calyx-tube* cylindric, .25 in. long, limb .25 in., lobes ovate. *Petals* densely silky externally. *Ovary* tomentose, style distinct. *Pod* not seen.

Very nearly related to *B. lucida* Wall., but at once distinguished by its deeply bifid leaves which are tomentose beneath, and by its shorter, few-flowered racemes.

18. *BAUHINIA KURZII* Prain. (*B. rosea* Kurz, not Miq.)

Add to localities:—TENASSERIM; on Taepo, at 5000 feet, *Gallatly*!

When Mr. Kurz published his description of *B. rosea* in 1873 he overlooked the fact that Dr. Miquel had already given the name (in 1844) to a quite different species from Dutch Guiana.

19. *BAUHINIA RUFa* Grak.

Add to synonyms of *F. B. I.*:—*B. Vahlîi* Kurz, *Journ. As. Soc. Beng.* xlv. 2. 289; *For. Flor. Brit. Burma*, i. 401, not of W. & A.

Add to localities:—PEGU; Hills East of Tounghoo, at 2000 feet, *Brandis*! TENASSERIM; near Moulmein, *J. Anderson*!

Calcutta Garden Collectors have also quite recently obtained it in the Assam valley, as well as in Silhet. Sir Dietrich Brandis has noted that the flowers are "white, fragrant."

Mr. Kurz reduced *B. rufa* to *B. Vahlîi*, a somewhat unusual step to take seeing that, if the two had been conspecific, *B. rufa* was the older and therefore the preferable name. But as Mr. Baker has shown, the two species are perfectly distinct. *B. Vahlîi* has never been found in Burma: both occur in Assam so that the areas which the two occupy overlap to some extent, but in a general sense *B. rufa* may be considered the eastern representative of the more widely distributed and much commoner *B. Vahlîi*.

21. *BAUHINIA SEMIBIFIDA* Roxb.

Add to synonyms of *F. B. I.*:—*Bauhinia ferruginea* var. *excelsa* Bak. in *Flor. Brit. Ind.* ii. 283 not *Phanera excelsa* Bl. *Phanera sumatrana* Miq. *Flor. Ind. Bat.* i. 1078.

Add to localities:—SINGAPORE; very common. *DISTRIB.* Sumatra; Borneo.

It should be noted that the original examples of *B. semibifida* came from Sumatra. This plant is usually much confused in herbaria with *B. ferruginea*. The species is not ecirrhose; the flowers, when the plant is grown so far north as Calcutta, as a reference to Wallich's specimens or to Roxburgh's figure (reproduced by Wight) will show, are somewhat smaller than when the specimens come from Singapore, Sumatra or Borneo.

22. *BAUHINIA MOLLISSIMA* Wall.

Add to localities:—PERAK; very common. KEDAH; *Ridley*! MALACCA; *Maingay*!

As this name is considerably older than the name *B. elongata* Korth, one or other of our priority-hunters will be certain one of these days to propose its adoption; it may therefore be as well to alter it now. But it is obviously very undesirable that an insistence on the observation of this rule regarding priority should enable a

naked name like Wallich's to displace the name given by Korthals along with a full description and an excellent plate. *B. Pottsi* G. Don, *Gen. Syst.* ii. 462 is much better referred here than to *B. ferruginea*.

25. *BAUHINIA PIPERIFOLIA* Roxb. *Flor. Ind.* ii. 327; *Bak. in Flor. Brit. Ind.* ii. 285. *Phanera glabrifolia* Benth. *Pl. Jungh.* 263. *Bauhinia glabrifolia* Bak. in *Flor. Brit. Ind.* ii. 281 (as to description and as to synonyms, but excluding the plant from Tenasserim). *B. lucida* Wall. *Cat.* 5779B, not 5779A.

ASSAM; *Simons!* SILHET; *fide* Roxburgh.

It has been a standing puzzle for many years to Indian botanists why Mr. Bentham, whose judgment, in all matters relating to Leguminosæ, deserves perhaps greater attention than that of any other author, should have decided that the plant cultivated in the Calcutta garden as *B. piperifolia* could not be Roxburgh's plant. Roxburgh's description is extremely meagre if it is true, but the only apparent discrepancy lies in the number of nerves (given by Bentham as 4 for each lobe and therefore 9 for the whole leaf, by Roxburgh as 5-7) and the shape of the leaves, (given by Roxburgh as entire by Bentham as shortly bifid at the apex). These are not really discrepancies; the upper leaves on twigs are most usually 5-7-nerved and entire; those below are most usually, though not always, 2-fid and 7-9-nerved. One point which both Roxburgh's and Bentham's diagnoses omit to note is that the leaves on root-shoots and on young plants may be completely 2-lobed to the very base exactly as in a species of the section *Lysiphyllum*. The plant is not cirrhose.

25/b. *BAUHINIA GLABRIFOLIA* Bak. in *Flor. Brit. Ind.* ii. 281 excluding description and synonyms; cirrhose, leaves 9-nerved, pubescence thin grey, pedicels rather short, flowers small, calyx-tube turbinate, limb rather exceeding the tube, petals little exserted. *B. piperifolia* Kurz, *Journ. As. Soc. Beng.* xlv. 2. 288 not of Roxb. *B. anguina* Kurz, *Journ. As. Soc. Beng.* xlv. 2. 288 not of Roxb. *Phanera diptera*, *Miq. Flor. Ind. Bat.* i. 70. *Bauhinia diptera* Bl. ex *Miq. Anal. Ind.* i. 12.

PEGU; Kurz! TENASSERIM; *Helfer* 1879! 1880! PERAK; *Scortechini* 316! 1512! Wray 3960! *Kunstler* 4311! 4511! 6170! PENANG; *Curtis* 801! 1541!

Branchlets slender at first finely silky. *Leaves* shallowly to deeply cordate, rigidly subcoriaceous, glabrous shining above, moderately large, quite entire or with 2 acute lobes reaching $\frac{1}{6}$ — $\frac{1}{4}$ down; leaves on root shoots and on young plants quite bilobed to the base (as in § *Lysiphyllum*). *Flowers* in panicles of dense many-flowered short-peduncled corymbs; bracts long lanceolate persistent; pedicels slender ascending; never exceeding .5 in., usually only .3-35 in., clothed like calyx with grey-silky pubescence. *Calyx-tube* .5 in.; bud globose; limb usually not fully 5-cleft. *Petals* obovate clawed, densely silky on the back. *Ovary* densely silky, short-stalked; style produced, stigma small.

This plant was considered by Mr. Kurz as well as by Mr. Baker to be the same as *B. piperifolia*. An examination of Mr. Kurz's specimens, which form the basis of his descriptions in the *Forest Flora* and in his other papers, shows that what he has treated as *B. anguina* is in every case the present species. *B. anguina* does occur in Burma but all the specimens of that species have been treated by Mr.

Kurz as *B. macrostachya* Wall! The present species is extremely closely related to *B. piperifolia* but can be at once distinguished by its shorter pedicels, its much larger bracts, and its pubescent ovaries.

The name here adopted calls for explanation. This is evidently the same plant as the species somewhat rashly described by Miquel (from leaf specimens only) as *Phanera diptera*, which Miquel says had received from Blume the tentative MSS. name *Bauhinia diptera* Bl. But these dipterous leaves occur only on seedlings and root-shoots, and the name, being singularly inappropriate for the species as a whole, is better neglected. The species described in the *F. B. I.* as *B. glabrifolia* is really *B. piperifolia* Roxb. but as Mr. Baker has cited along with *B. piperifolia* specimens of the present one under his *B. glabrifolia*, the latter name has been retained for this plant; it must, however, be recollected that this is done to the complete exclusion of the plant described and the synonyms cited by Baker.

An incidental advantage of neglecting the name *Bauhinia diptera* Bl. is that it becomes thus unnecessary to alter the name of a very distinct species from Upper Burma described by Sir H. Collett and Mr. Hemsley as *B. diptera*, these authors having for the moment overlooked the fact that their name was preoccupied.

30/1. *BAUHINIA TENUIFLORA* Watt ex Clarke in *Journ. Linn. Soc.* xxv. 18; cirrhose, pubescence thin ferrugineous, leaves 9-nerved not cleft to the middle, pedicels moderately long, calyx-limb very much shorter than the much elongated cylindric tube, petals sparsely pubescent externally.

KHASIA HILLS; *Hooker and Thomson.* NAGA HILLS; Watt 6915! MANIPUR; *Clarke!*

Leaves shortly bilobed, lobes obtuse, about 3 in. wide. *Corymbs* many-fl., rusty tomentose, peduncles 1-2 in. long, pedicels rusty-pubescent the lowest 1·5 in. long. *Calyx-tube* linear 1 in. long, lobes lanceolate 25 in. *Petals* white, margin wavy, back sparsely pubescent; 6 in. long, oblong, long-clawed. Fertile *stamens* 3, filaments longer than petals, glabrous. *Ovary* glabrous. *Pod* 8-9 in. long, 1·75 in. wide, much compressed, thin, glabrous. *Seeds* 15-20, oval, 5 in. long, 3 in. across.

Very near *B. corymbosa* but with longer, less divided leaves and broader pods; also near *B. glauca* but with leaves less divided and calyx-tube very much longer.

30/2. *BAUHINIA DIPTERA* Coll. & Hemsl. *Journ. Linn. Soc.* xxviii. 53; cirrhose, glabrous, leaflets distinct, small, 3-4-nerved, pedicels long, calyx-limb 2-3-lobed, longer than the cylindric tube, petals glabrous exerted.

BURMA; Shan hills, at Koni, *Collett!* Prazer! Ywangyen, *Collett!*

Branchlets slender glabrous; tendrils small few. *Leaves* very small and quite 2-lobed (as in § *Lysiphyllum*), leaflets sessile submembranous oval-elliptic 75-1 in. long, rounded at both ends, rather pale beneath; stipules minute early deciduous. *Flowers* in lax subcorymbose 5-11-fl. racemes, lower pedicels 75 in. long, *Calyx-lobes* 35 in. long, apiculate, tube 25 in. long. *Petals* unequal narrowly spatulate, margins wavy, longest 75 in. long. *Stamens* 3 fertile, filaments far exceeding the corolla-lobes, 1·5 in. long. *Ovary* long-stalked, about 12-ovuled, glabrous, style 5 in. long, stigma small. *Pod* 2·5 in. long, linear-oblong, 5 in. wide, glabrous, slightly transversely impressed between the seeds, narrowed to an acute beak; stipe 3 in.

long. Seeds 8-10, much compressed, wide-ovate, .25 in. long, .2 in. wide, pale-brown, testa shining.

A very distinct species not nearly related to any hitherto known form. The name *B. diptera* is, as has already been explained under *B. glabrifolia*, preoccupied. Owing, however, to its inapplicability to the more usual form of the species it was intended to designate, the original name *B. diptera* Bl. should be allowed to lapse. In the event, however, of our bibliographers being permitted to substitute the name *B. diptera* Bl. for the name *B. glabrifolia* Bak., it will be necessary to use, instead of *B. diptera* Coll. & Hemsl., the name *B. Collettii* for the present plant.

31. BAUHINIA FERRUGINEA Roxb.

Delete both varieties; also delete from the synonyms:—*Korth. Nat. Verh. Geschied. Bot. t. 23*: *B. Pottsii* *G. Don, Gen. Syst. ii. 462*.

The only point wherein the *F. B. I.* description is inapplicable to the plant described and figured by Roxburgh and issued by Wallich as *B. ferruginea* and again described by Bentham as *Phanera ferruginea*, is as regards the length of the pedicels; these do not, even in fruit, reach half-an-inch in length. Korthal's plant is certainly not Wallich's and Roxburgh's and therefore is not *B. ferruginea* Roxb. As it happens, it forms the basis of *Phanera excelsa* Miq., which is quoted as a synonym of *B. ferruginea* var. *excelsa* and is thus apparently accounted for in two places in the *F. B. I.* As a matter of fact, however, the specimens from Malacca that form the basis of var. *excelsa* do not belong to *Phanera excelsa* Miq. (*B. excelsa* Bl.=*B. ferruginea* Korth. not Roxb.) Nor do they belong to *B. ferruginea*; they have petals almost glabrous externally and have long pedicels, and are the same as *Phanera sumatrana* Miq. which, in turn, is identical with *B. semibifida* Roxb.

Bauhinia Pottsii *G. Don*, by its description cannot possibly be *B. ferruginea* because of its having pubescent pods. There is nothing in *Don's* short description to separate it from *B. mollissima* Wall. (*B. elongata* Korth.) and it should be referred as a synonym to that species.

31/1. BAUHINIA RIDLEYI Prain, *Journ. As. Soc. Beng. lxi. 2. 185*; cirrhose, pubescence very densely silky-ferrugineous, leaves 9-11-nerved cleft one-third down, pedicels very short, calyx-limb 5-cleft rather exceeding the ampullaeform tube, petals not exerted densely silky.

PERAK; *Scortechini*! *Kunstler*! PENANG; *Ridley*! *Curtis*! JOHORE; *King and Hullett*!

Branchlets persistently tomentose. Leaves strigose above, densely tomentose beneath, lobes subacute, 2.5-4 in. long. Flowers in very dense terminal corymbs, 2 in. long and broad; densely softly rusty-silky bracts large ovate. Calyx-tube .3 in. long. Petals oblong obtuse. Stamens 3. Style stout .5 in. long. Pod unknown.

Near *B. ferruginea* but with denser pubescence and distinctly pubescent leaves; the very dense corymbs and short petals at once distinguish it from the other members of its group.

31/2. BAUHINIA GRIFFITHIANA Prain, *Journ. As. Soc. Beng. lxi. 2. 183*; cirrhose, pubescence bright-ferrugineous, leaves 9-11-nerved cleft one-third down, stipules large orbicular persistent, calyx-limb 5-cleft rather exceeding the ampullaeform tube, petals exerted densely silky.

Phanera Griffithiana Benth. *Pl. Jungh.* 263. *B. ferruginea* VAR. *Griffithiana* Bak. in *Flor. Brit. Ind.* ii. 283.

MALACCA; *Griffith!* *Maingay!* *Hervey!* *Derry!* *Holmberg!* PERAK; *Scortechini!* PAHANG; *Ridley* 2606!

Very nearly related to the true *B. ferruginea* and differing mainly in having large orbicular persistent stipules .75 in. across, in having yellow instead of white flowers, and in having inflated instead of uniform fertile filaments.

31/3. BAUHINIA HULLETTII *Prain, Journ. As. Soc. Beng.* lxi. 2. 183; cirrhose, pubescence bright ferruginous, leaves 9–11-nerved cleft one-third down, stipules large, persistent, pedicels long, calyx-limb 5-cleft rather exceeding the ampullaeform tube, petals far exserted densely silky.

PENANG; *Curtis!* *Scott!* *Kunstler!* PERAK; *Wray!* MALACCA; *Holmberg!*

Very nearly related to *B. Griffithiana* and with similar stipules which are however smaller (only .5 in. across) and hirsute; the leaves are also persistently pubescent and the corymbs are few-fl., the flowers are long-pedicelled (the pedicels 1.25–1.5 in. long), the calyx and petals rose-red.

32/1. BAUHINIA ALBO-LUTEA *Prain, Journ. As. Soc. Beng.* lxi. 2. 181; cirrhose, pubescence usually thin, rusty, leaves 9–11-nerved cleft one-third down, pedicels long, calyx-limb 5-cleft rather exceeding the ampullaeform tube, petals exserted glabrous except for a few hairs on the midrib externally. *B. ferruginea* Kurz, *Journ. As. Soc. Beng.* xlv. 2. 128 and 289, not of Roxb. *Phanera albo-lutea* Miq. *Flor. Ind. Bat.* i. 1079.

BURMA; Pegu, Kurz 1680! Tenasserim, *Gallatly!* NICOBARS; Great Nicobar, *Jelinek!* DISTRIB. Sumatra.

A slender shrubby climber, tendrils circinate glabrous. Leaves rigidly subcoriaceous, cordate, 2.5–4 in. long, lobes subacute, glabrous above, persistently puberulous to pubescent beneath; stipules persistent rather large. Flowers in terminal corymbs, 3–4 in. long, lax-fl., pedicels 1.5–1.75 in. long; bracts lanceolate deciduous. Calyx-tube .4 in. long, sepals narrowly lanceolate coriaceous, distinct. Petals oblanceolate subacute clawed. Stamens 3. Ovary sparsely puberulous, style long slender glabrous, stigma rather small. Pod thin, oblong, glabrous, woody. Seeds 2.

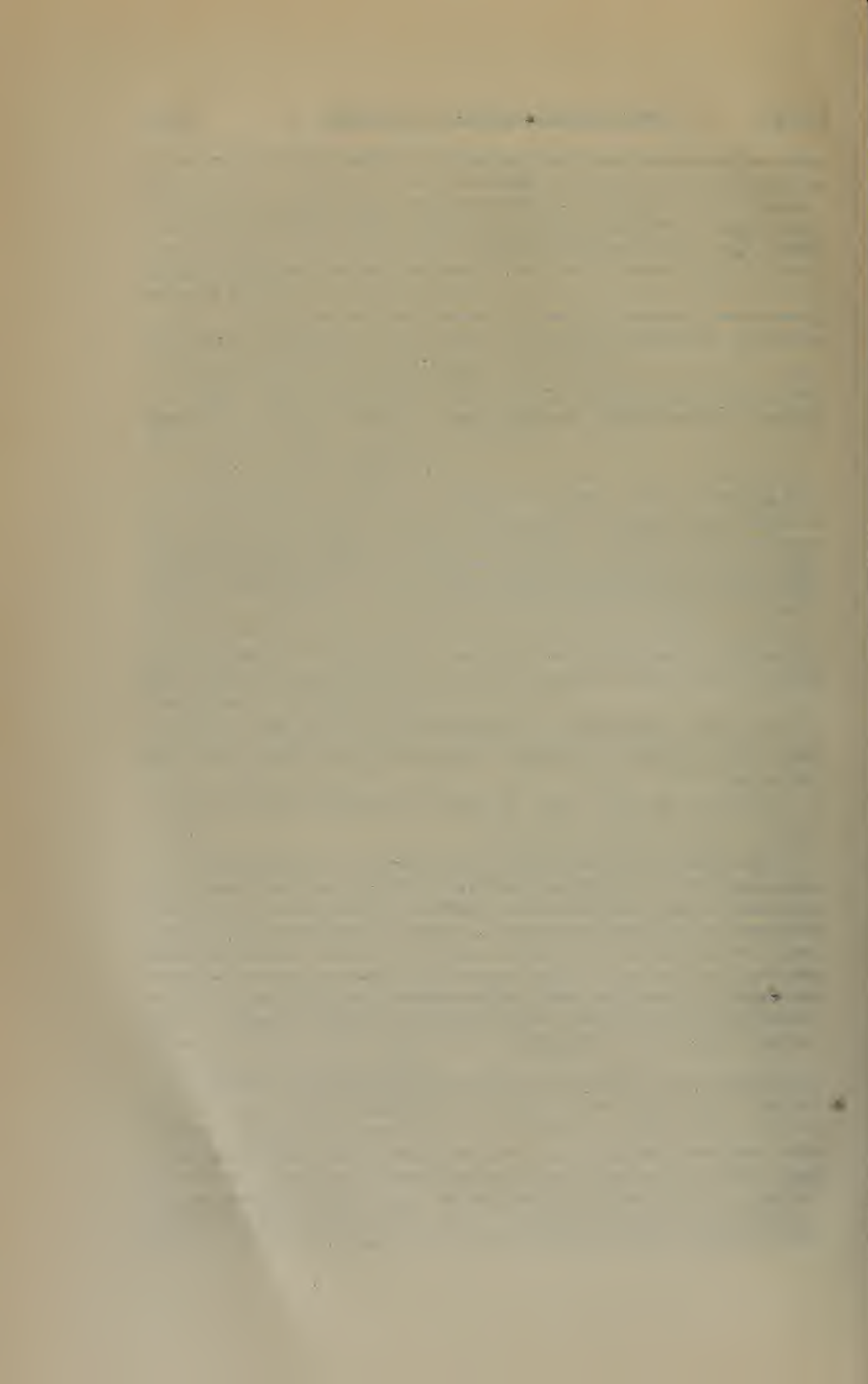
Resembles *B. nervosa* in foliage and stipules and *B. semibifida* in petals.

36. BAUHINIA ANGUINA Roxb.

Leaves thin glabrous beneath, ovary glabrous, pod short oval 1–2-seeded, glabrous; calyx-tube very short, limb 5-fid.

36/1. BAUHINIA CHAMPIONII Benth., *Fl. Hong-Kong.* 99; leaves thin adpressed-pubescent beneath; ovary pubescent, pod oblong, 3–5-seeded, glabrescent; calyx-tube very short, limb 5-fid.

SIKKIM; Tista Valley, common, *King!* Kurz! etc. ASSAM; Brahmaputra, *Masters!* DISTRIB. China.



the writer without hesitation has widened the limits of the section so as to admit it. When *B. Championii* and the allied *B. Curtisii* are included there is nothing in the pods of *B. strychnoidea* to warrant its exclusion; the only differential character left is the entire calyx-limb, and that taken by itself seems barely sufficient to warrant the establishment of a new section.

37. *BAUHINIA MONANDRA* Kurz.

The oldest name for this species is *B. Richardiana* Wall. in Voigt. *Hort. Suburb.* 255 (1845) not of DC. The original *B. Richardiana* DC. (*Prodr.* ii. 517) from Guiana, which Dr. Wallich seems for the moment to have overlooked, has cordate entire leaves and therefore, though it is in other respects a doubtful species, cannot be this plant.

That this species is not (as Mr. Kurz and Mr. Baker have treated it) a native of India is beyond dispute; what its original country may be is, however, somewhat doubtful. The history of its introduction may be best given by transcribing *verbatim* the passage in Dr. Wallich's MSS. Catalogue of the Calcutta Garden (Vol. i, p. 542), whence Voigt obtained the name. This passage runs as follows:—

"*Bauhinia Richardiana* Wall. 'A tree.' No doubt a distinct species, with "large round-cordate two-lobed leaves smooth except a little pubescence on the nerves "and veins on the glaucous under surface, opaque above; 13-nerved; petioles "shortish; stipules lanceolate very small, as well as the young parts a little villous. "It is now (see date) in flower and a most beautiful plant. It is of the section "*Casparea*; large ovate, pointed, shortish but distinctly clawed pale-pink petals with "crispate margins and with very conspicuous darker-coloured dots; lip crimson and "spotted within, oblong and slightly three-lobed, channelled and pubescent at the "margins below.

"Madagascar; Mons. Richard, 16 May, 1840; germinated, 21st, same month; "August 22, 1841, it flowered; pod ripened, 6th December, 1841."

The time between receipt of seed and flowering seems remarkably short!

The subsequent history of the species in India may be briefly given. Specimens in the Calcutta Herbarium show that about 1855 it had become confused in the Royal Botanic Garden with *Bauhinia (Phanera) variegata*; and in the Serampore garden (though not in the Calcutta one) with *Bauhinia aurantiaca*, a species with 6 fertile stamens, which was first sent to India from the western shores of Madagascar by M. Gereve in 1835 and was again sent along with our present plant by M. Richard on 16th May, 1840, on that occasion flowering on the 22nd March, 1841.

It had also found its way to Southern and to Western India; the gardeners in Madras confuse it to this day with *B. variegata*; those of Bombay had examined it more closely, for specimens from the herbaria of Stocks and of Dalzell are named *B. latifolia*. They have thus placed it in the true section, since *B. latifolia* Cav. is a *Casparea*; an examination of Cavanille's original figure shows, however, that this is quite distinct from his plant.

At present the species seems to have altogether disappeared from gardens in Bengal, but it lingers in Martaban; doubtless, judging from Kurz's two quoted names (*Shway-doh*, and *Shway-ton*), in temple gardens. It has also been recently sent from Poona and from Chittagong.

It would be interesting to learn if the species be really a native of Madagascar or if it had been originally introduced to that island from elsewhere. The writer has failed to trace it in any work dealing either with African or American botany: one thing only is quite certain—it is not a native of India or of South-Eastern Asia at all

122. PARKIA R. BR.

2b. *PARKIA SPECIOSA* Hassk. *Flora* xxv. 2, *Beibl.* 55; gland of petiole solitary, leaflets linear-ligulate, 50–70 to a pinna, obtuse at the tip. *Hassk. Cat. Hort. Bog.* 289; *Pl. Jav. Rar.* 414; *Miq. Flor. Ind. Bat.* i. 53. *P. macrocarpa* *Miq. Flor. Ind. Bat. Suppl.* 284. *Acacia graveolens* Jack, *Mal. Misc.* ii. 7. 78.

PENANG; cult., *Curtis!* PERAK; Thaiping, *Scortechini!* Larut, *Kunstler!* DISTRIB. Sumatra; Java, cult. (*Hasskurl!*)

A tree 80–100 feet high. *Leaf-rachis* 8–10 in. long, pubescent; pinnæ sub-alternate, 10–16 pairs, leaflets 50–70, .25 in. long, .1 in. wide, the secondary veins as well as the midrib distinct beneath. *Peduncle* 16–20 in., flowers in clavate heads 2 in. long, .75 in. in diam. *Calyx* .25 in. long; tube cylindric, glabrous; lobes pilose. *Pod* 18–20 in. long, 2–2.5 in. wide, narrowed into a stalk 2–5 in. long.

A very distinct species; the *Pete* or *Pethek* of the Malays.

125. MIMOSA LINN.*

1. MIMOSA PUDICA Linn.

In this species, the stamens are always 4 in number, *i.e.* equal to and *not*, as the *F. B. I.* implies, twice the number of the petals.

126. ACROCARPUS W. & A.

1. ACROCARPUS FRAXINIFOLIUS Wight.

Add to localities of *F. B. I.*:—CHITTAGONG; *Lister!* PEGU; *Kurz!*

127. ACACIA WILLD.

2. ACACIA PLANIFRONS W. & A.

To this Mr. Baker has reduced *A. Roxburghii* W. & A. Wight and Arnott based their species on Roxburgh's figure of the tree he took to be *A. eburnea*, which certainly is not that species. Unless Dr. Roxburgh made a mistake in his drawing, a thing that is highly improbable, the *F. B. I.* reduction is clearly impossible, for *A. planifrons* has a terete pod and *A. Roxburghii* has a flat one. There are, as a matter of fact, two species that have been frequently reported from Southern India to the Calcutta Herbarium under the name *A. planifrons*; these are certainly exceedingly similar, still they can be separated by their leaves alone. The first, which has terete pods, has leaflets exactly like those of the types of *A. planifrons* W. & A. The second, which has leaflets exactly like those of Roxburgh's figure of "*Mimosa eburnea*," has never yet been reported in fruit; till its pods are available, the difficulty as regards these two forms cannot be satisfactorily settled.

6b. *ACACIA KINGII* Prain; pinnæ short, crowded, 18–20, leaflets 22–28, heads axillary; pedicels with a whorl of bractlets.

SHAN HILLS; *King's Collector!*

* *Mimosa niamensis* Roxb. is given in the *Index Kewensis* as an altogether doubtful synonym. By a *lapsus calami* the species is said to be African; it was from America, Roxburgh states, that the plant was received (*Hort. Beng.* 41) and the plant cultivated under this name in *Hort. Calcutta* has always been a form, hardly a variety, of *Desmanthus brachylobus* (*Mimosa brachyloba*), which was also received by Roxburgh from that continent.

A tree 30–40 feet high, with slender black slightly zig-zag glabrescent branches. *Spines* stipular only, very small and weak, always under .2 in. long. *Leaf-rachis* sparsely pubescent, 2–3 in. long with a large flat petiolar gland just below the first pair of pinnæ; pinnæ 1 in. long, leaflets ovate-oblong crowded, .2 in. long, .1 in. across, subcoriaceous. *Peduncles* crowded in the axils of full grown leaves, .75 in. long, with ring of bracts above the middle. *Heads* .4 in. in diam. *Calyx* campanulate minute. *Corolla* thrice the calyx, teeth short subacute. *Staminal-tube* much shorter than that of corolla.

This species and the next are somewhat unlike any of the other Indian *Acacias*. The flower-head are exactly those of species of *Acacia* of the *Farnesiana* or the *arabica* groups, but the connate filaments suggest that they are not *Acacias*. They do not bear much resemblance to any of the *Albizzias* or *Pithecolobiums*; in foliage, however, both plants recall some of the American species of *Calliandra*. The amount of union of filaments is not in the present plant very great, the staminal tube being hardly longer than the stipe of the ovary and, had there been no other to deal with, the writer would have felt but few misgivings about referring it to *Acacia*.

6c. *ACACIA* ? *INOPINATA* Prain; pinnæ long, distant, 12–14, leaflets 20–22, heads in lax panicles; pedicels with a whorl of bracts.

SHAN HILLS; *King's Collector*!

A tree? with slender black straight glabrous branches. *Spines* 0. *Leaf-rachis* glabrous, 8–10 in. long, with two large flat petiolar glands below the bases of the 2 distal pairs of pinnæ; pinnæ 2 in. long; leaflets linear-oblong, .35 in. long, .15 in. wide, subcoriaceous. *Peduncles* in fascicles of 3–4, on the branches of a lax, twice branching terminal panicle 1–1.5 feet long, secondary branches 6–8 in. long, tertiary branches 3 in. long, pedicels .6 in. long, slender, puberulous, with a ring of bracts just below the middle. *Heads* .4 in. in diam. *Calyx* campanulate minute. *Corolla* thrice the calyx-teeth, short subacute. *Staminal* tube almost equalling that of corolla.

A remarkable plant, evidently congeneric with and nearly related to the last species, but at the same time very distinct by reason of its staminal tube, formed by the more or less regular union of the filaments throughout their lower two-thirds to three-fourths. The writer was at first inclined to treat these two plants tentatively as *Calliandras* and indeed issued specimens as such. His friends on the Kew staff, however, suggest that both should be treated as *Acacias*; in deference to their opinion this course is here adopted; it will be noted that the location of the present plant in *Acacia* violates the one character on which the existence, not merely of the genus *Acacia*, but of the tribe *Acacieae* depends.

7. *ACACIA LEUCOPHLOEA Willd.*

Under *VAR. microcephala* (Grah.), Mr. Baker places both *A. microcephala* Wall. Cat. 5263 and *A. densa* Wall. Cat. 5262. The last mentioned is a form that is of frequent occurrence in the Shan Hills, it has fruits exactly like typical *A. leucophloea* and the writer agrees with Mr. Baker in reducing it to Willdenow's species. *A. microcephala* Grah., however, has very different pods, never under 5 in. long or .5 in. wide and always glabrous; it is therefore, in the writer's opinion, not only necessary to distinguish it from *A. leucophloea VAR. densa*, but preferable to consider it, as Graham did, a distinct species.

8. *ACACIA SUMA* Buch.-Ham. in Wall. Cat. 5227 C.; Voigt, Hort. Suburb. 260; Kurz ex Brand. For. Fl. 187.

Why Kurz should be quoted as the authority for this species is not clear; he himself (see *For. Flor. Brit. Burm.* i. 421) attributes the authorship to Buchanan-Hamilton. The *Index Kewensis* gives the citation in such a manner as to make it appear that *A. Suma* Ham. and *A. Suma* Kurz are different plants; it permits the latter to stand and reduces the former to *A. Sundra*. However, the citation in the *Index* shows that it is "*A. Sundra* Wall.," not *A. Sundra* DC. to which *A. Suma* Ham. is equivalent, and as it immediately afterwards reduces "*A. Sundra* Wall." to *A. Suma*, the *Index* corrects itself. Obviously, however, the authority to be cited is Hamilton, not Kurz.

Mr. Baker's diagnosis of the species is very effective and settles once for all the identity and the specific rank of "*Suma*" as opposed to what may be termed the "*Khairs*."

9. *ACACIA CATECHU* Willd.

10. *ACACIA SUNDR*A DC.

There has always been some difficulty in deciding how many different forms of *Kutch* or *Khair* occur in India. Wight and Arnott seem to recognise only two, *A. Catechu* and *A. Sundra*. But their *A. Catechu* is *A. Suma* (the true *A. Catechu* apparently does not occur in South India at all, and there are certainly no specimens of it in Wight's herbarium); *Suma* is not a *Khair*, so that in reality Wight and Arnott only deal with one *Khair*. *A. Suma*, as Mr. Baker has clearly shown, cannot be confused with any of the "*Khairs*;" it has white bark and white flowers, and has petals hardly longer than the downy calyx; it may then be once for all definitely separated from the others.

Of these others Roxburgh recognised three, *A. Catechu*, *A. catechuoides*, and *A. Sundra*; Baker, reducing *A. catechuoides* to *A. Catechu* and retaining *A. Sundra* as a species, recognises two; Kurz (*For. Flor. Brit. Burma* i. 422), recognises but one species, *A. Catechu*, though he divides it into two varieties which he terms *Catechu proper* and *Sundra*; these varieties correspond exactly to the two species given by Mr. Baker, for under *Catechu proper* Kurz mixes the *A. Catechu* and the *A. catechuoides* of Roxburgh. That Roxburgh was right is, however, very apparent when large suites of specimens, such as are preserved in the Calcutta Herbarium, are available for study. There are three equally distinct and very easily separable forms, exactly as Roxburgh pointed out, and though the writer, following Kurz, is only able to see in them different forms of one species, or at most three species of secondary rank, he is quite satisfied that all three are entitled to equal consideration.

The diagnosis of these forms is as follows:—

Bark white, calyx downy, not much shorter than

petals 1. *A. Suma* Ham.

Bark brown, calyx less than half as long as

petals 2. *A. Catechu* Willd. : Kurz.

a. Calyx, petals and rachis covered with spreading hairs (= *A. Catechu* Willd.).

b. Calyx and petals glabrous, rachis puberulous (= *A. catechuoides* Bth.).

c. Calyx, petals and rachis all glabrous (= *A. Sundra* DC.).

The distribution of the "Suma" and the three "Khairs" is as follows:—

ACACIA SUMA Ham.

SOUTH INDIA; very common everywhere on the eastern side of the Peninsula from the Carnatic and Mysore to Orissa and Behar; (never reported as yet from Central India, the Western Deccan, the Concan, Rajputana, or the Panjab.) ASSAM; very common in the Brahmaputra Valley and also in Silhet; (never recorded from Burma.)

ACACIA CATECHU Willd.

NORTHERN PANJAB; Hooshiarpur, *Aitchison!* NORTH WEST HIMALAYA, up to 3,000 feet; from Hazara, *Stewart* 400 bis! to Kangra, *Clarke* 24641! Sirmoor, *Vicary!* Simla, *Griffith!* Garhwal, at Srinagar, *Thomson!* on the Mussoorie range, *King!* CENTRAL INDIA; Sangor, *Vicary!* Goona, *King!* Gwalior, *Maries!* BEHAR; common; *Hooker!* *Clarke* 17311! *Kurz!* *Gamble* 8887! *Prain!* GANJAM; *Gamble*, 13810! 13983! BURMA; Pegu, very rare, *Kurz!* (This has never been reported from Rajputana, from the Concan, or from the Deccan; on the Eastern side of the Peninsula it has never been found south of Ganjam; it has never been found in the Eastern Himalaya or in Assam; in Burma it has only been found in Pegu; *Kurz* notes its name there as "*Sha.*")

ACACIA CATECHUOIDES Benth.

BENGAL; at Morung and Bangka, near Monghir, *Hamilton* (in *Wall. Cat.* 5228 B)! Pabna, among village bushes, *Kurz!* SIKKIM TERAI; *Hooker!* *Gamble* 4084! *Clarke* 26522! *Heawood* 28! ASSAM; common, *Griffith* 1918! *Jenkins!* *Masters!* *Simons!* BURMA; Irrawaday Valley, *Wallich* 5228 D! Pegu, *Eyre!* *Kurz* 1749! 2580! 2581! Amarapura, *King's Collector!* (Though apparently quite common in Pegu and Prome this has neither been collected in the Shan Hills nor in Upper Burma to the north of Ava). TENASSERIM; Tavoy, *Gomez* (*Wall. Cat.* 5228E); (this last is only in fruit and it is a little doubtful if it be *A. catechuoides*).

ACACIA SUNDRA DC.

SOUTH INDIA; very common from Coimbatore northwards to the Deccan, equally common in Kanara and the Concan. KATTIWAR; at Rajkote, *McNaghten!* RAJPUTANA; Mt. Abu, *King!* BURMA; Segain, *Wallich!* Mandalay, *J. Anderson!* Meiktila, *Collett* 854! Shan Hills, common. (This species in India has never been reported from Orissa, Central India, Behar or from any locality to the east of these areas; in Burma, where it recurs, it seems to be common to the north and east of Pegu and Prome, but has never been recorded from either of these districts.)

This record of distribution, which is based on an examination of over 100 gather-

ings, shows that the 3 forms of "Khair" hardly overlap but appear rather to be representative one of another in tolerably well-defined areas. The fact that *A. Sundra* should fill the area to the south-west of that occupied by *A. Catechu* and should again recur in an indistinguishable form to the east of that occupied by *A. catechuoides* is perhaps as good a proof as any that all three are but manifestations of one species. It is interesting to note that the area occupied by *A. Suma* crosses that occupied by this amplified *A. Catechu* almost at right angles, and that though it is in Mysore intimately associated with *A. Sundra*, in Orissa and Behar with *A. Catechu* proper, and in Assam with *A. catechuoides*, it nowhere shows the least tendency to pass into any of these forms. In this, the writer believes, we have a very strong confirmation of the justice of Mr. Baker's treatment as opposed to that of Dr. Wight.

12. ACACIA SENEGAL Willd.

Add to localities of *F. B. I.*:—

RAJPUTANA; very common everywhere, *King! Brandis! Moir! Duthie!* PANJAB; at Rhotak, *Bailey!*

17. ACACIA INTSIA Willd.

The writer quite thinks with Mr. Baker that *A. oxyphylla* Grah. is only a variety of *A. Intsia*.

A. Caesia, however, the writer agrees with Wight and Arnott and with Kurz in keeping separate. The crowded leaflets, always hairy beneath, make it very easy to recognise *A. Caesia*, even in the herbarium, and apart from the fact that its general facies is quite different from that of *A. Intsia* and that no one dreams of confounding the two as they grow. But *A. pseudo-Intsia*, referred to *A. Caesia* in the *F. B. I.*, is a very distinct species that, though resembling *A. Caesia* in externals, is in reality more nearly allied to *A. pennata* than it is either to *A. Intsia* or to *A. Caesia*.

18. ACACIA PENNATA Willd.

1. VAR. *canescens* seems certainly a distinct species, easily separated from *A. pennata* by its longer pedicels and its pale, differently shaped pods. Very nearly related to this is another form from Burma, like *A. canescens* Grah. in other respects but with rather larger leaflets and with much larger pods; they have, however, the slightly thickened sutures that are found in the pods of true *A. canescens*. This large fruited form must be known as *A. pennata* VAR. *macrocarpa* or *A. canescens* VAR. *macrocarpa* according to the view that is adopted regarding *A. canescens*.

Typical *A. canescens* is common in Burma and also occurs frequently in Western India from Canara to Travancore; it appears never to have been collected in India to the east of the Western Ghats.

2. VAR. *arrophula* also appears to the writer to deserve specific rank. The stipular gland is, however, quite the same as in true *A. pennata* and there are some specimens regarding which it is not easy to decide in the herbarium whether they should be referred to VAR. *typica* or to VAR. *arrophula*. The most satisfactory diagnostic characters seem to be the pubescent rachis never prickly beneath (typical *A. pennata*) and the glabrous rachis prickly beneath (*A. arrophula* Don.), but sometimes the rachis in *A. arrophula* is pubescent and prickly, sometimes glabrous and unarmed. No one could possibly confound the two in the field.

3. VAR. *pluricapitata* would also certainly be better considered a distinct

species. The petiolar gland is totally unlike that of typical *A. pennata* or that of *A. arrophula*.

19. *ACACIA PRUINESCENS* Kurz, *Journ. As. Soc. Beng.* xlv. 2. 298; *For. Flor. Brit. Burm.* i. 424; pinnæ 16–30, leaflets 80–120, rigidly coriaceous dimidiate-linear densely crowded, bracts large lanceolate; branches and branchlets usually covered with a waxy bloom.

ASSAM; Talap, Lakhimpur, *G. Gammie* 160! MANIPUR; Nong Shong Khong, *Watt* 6266! BURMA; Hukung Valley, *Griffith* 1930! Poneshee, *J. Anderson*! Pegu, Yomah, *Kurz* 1744! (the last with rather larger leaflets and without bloom.)

A large woody climber, armed with recurved thorns, stems thick, the young branches almost always pruinose; leaves up to 10 in. long, petiole short with a very large gland 1 in. above the base; leaflets sessile, up to 5 in. long, blunt, glabrous or with ciliate margins; heads 5 in. across, ovary glabrous. *Pod* unknown.

A very distinct species; the Pegu specimen above mentioned has been named *VAR. laevis* by Mr. Kurz and seems deserving of varietal rank. The pods described by Mr. Kurz as those of his plant belong, however, as his specimens show, to the quite different plant which must be treated as *VAR. macrocarpa* of *A. canescens* Grah., (*A. pennata* *VAR. canescens* Baker.)

20. *ACACIA PSEUDO-INTSIA* *Miq. Flor. Ind. Bat.* i. 12; pinnæ 12–16, leaflets 40–60 ligulate-oblong, rigidly subcoriaceous crowded, apex rounded not cusped, bracts large ovate-acute. *Prain, Journ. As. Soc. Beng.* lxvi. 2. 249.

VAR. typica; leaflets minutely adpressed-puberulous beneath.

SINGAPORE; *Hullett* 835! *Ridley* 3631! 6177! *DISTRIB.* Sumatra, Java.

VAR. ambigua *Prain, loc. cit.*; leaflets quite glabrous beneath.

ANDAMANS; very common.

Prickles numerous, short, straight or recurved. *Branchlets* and leaf-rachises faintly puberulous, the latter with a very large gland near base of petiole and with 2–3 similar but smaller glands between the bases of the distal pairs of pinnæ. *Pinnæ* 3–4 in. long; leaflets subcoriaceous 5 in. long, 15 in. wide, dark-green above, grey beneath, quite glabrous above, faintly adpressed-puberulous beneath in *VAR. typica*, glabrous beneath in *VAR. ambigua*. *Peduncles* 2–4-nate very rarely solitary, 5 in. long (in type) to 75 in. long (in *VAR. ambigua*), bracts large ovate-acute, puberulous or (*VAR. ambigua*) glabrous; heads yellow, 4 in. in diam. *Corolla* yellow. *Pod* not seen.

A distinct species, much resembling in externals *A. Intsia* and *A. Cæsia* but easily distinguished from both by its much larger bracts.

128. *ALBIZZIA* DURAZZ.

1b. *ALBIZZIA KALKORA* *Prain*; leaflets 24–32, obtuse, heads not panicked, calyx pedicellate funnel-shaped. *Mimosa Kalkora Roxb. Hort. Beng.* 40; *Flor. Ind.* ii. 547. *Albizzia Lebbek Forbes & Hemsl. Ind. Sinens.* i. 216 in part, not of *Benth.*

KHASIA HILLS; 3-4000 feet, *Mann* 388! NAGA HILLS; *Giesselieri*!
DISTRIB. S. China (*Henry* 6203).

A tall tree without prickles. *Leaves* glabrous with large gland near base of petiole and another between bases of last pair of pinnæ; pinnæ 6-12 (rarely 4), leaflets short-stalked rigidly subcoriaceous, main-nerve parallel with and slightly nearer the upper margin, 1-1.5 in. long, glabrous. *Heads* many-fl., peduncles 1-3 in axils of upper leaves, slightly puberulous, 2-2.5 in. long. *Calyx* .15 in., faintly puberulous. *Corolla* yellowish, silky externally, teeth long lanceolate. *Stamens* pink. *Pod* strap-shaped, firm, dark-brown, 6 in. long, 1 in. wide, 6-10-seeded, with a stalk .35 in. long.

Nearest to *A. Lebbek*; the long stalked-pod is, however, alone sufficient to separate it.

1c. *ALBIZZIA LITTORALIS* *Teysm. & Rinnend. Nat. Tijds. Ned.-Ind.* xxix. 259; leaflets 6-8, obtuse; heads in a terminal corymbose panicle, calyx pedicellate funnel-shaped. *Kurz, Journ. As. Soc. Beng.* xlv. 2. 129; *Prain, Journ. As. Soc. Beng.* lxi. 2. 257.

PENANG; Pulo Jungah, *Curtis*! NICOBARS; common, *Jelinek*! *King's Collectors*! DISTRIB. Malay Archipelago.

An unarmed tree 30-40 feet high. *Leaves* with glabrous rachis, with a large sessile gland near its base; pinnæ 4-8, leaflets subsessile submembranous oblique, .75-1.25 in. long, pale-green glabrous above, glaucescent faintly puberulous beneath. *Heads* few-fl., peduncles short slender, the longest 1.5 in., corymbose on branches 1-3 in. long which are themselves corymbosely panicked. *Calyx* .1 in. long, hardly toothed, pubescent. *Corolla* white, twice the calyx, the teeth ovate lanceolate, uniformly densely silky outside. *Stamens* pink. *Pod* strap-shaped, firm, greenish-brown, dull, tapering to both ends, 6-7 in. long, 1 in. wide, 12-16-seeded.

2. *ALBIZZIA PEDICELLATA* *Baker.*

Add to localities of *F. B. I.*—

PERAK; common, *Kunstler* 4474! 7988! 10436! PENANG; *Curtis* 1921! SINGAPORE; *Ridley* 6297!

2b. *ALBIZZIA ELEGANS* *Kurz, Pegu Rep. App.* B. 47; leaflets 40-50, acute; few-fl. heads not panicked, calyx pedicellate, funnel-shaped. *Kurz, Journ. As. Soc. Beng.* xlv. 2. 299; *For. Flor. Brit. Burm.* i. 427. *A. lebbekoides* *Kurz, ex Bak. in Flor. Brit. Ind.* ii. 299 not of *Benth.*

BURMA; Pegu; Bookee ridges and on banks of Swa-choung, *Kurz*! no locality, *Wallich*! DISTRIB. Bangka.

An evergreen tree without prickles, 80-100 feet high. *Leaves* with puberulous rachis with a large gland far above the base; pinnæ 14-28; leaflets sessile, sub-falcate, membranous acute glabrous, .6 in. long, .2 in. wide, main nerve almost median. *Heads* many-flowered, peduncles puberulous .5-.75 in. long, 2-4 together in axils of upper leaves. *Calyx* .1 in., rather shorter than the puberulous pedicels, teeth very short. *Corolla* twice the calyx, externally pubescent. *Pod* unknown.

Mr. Kurz adopted the unusual course of describing this species without having seen either flowers or fruit. There was, however, a flowering example of the same plant in the Calcutta Herbarium, collected by Dr. Wallich, perhaps in Burma

though the exact locality is not noted; this specimen Mr. Kurz seems to have overlooked. Dr. Wallich's specimen shows that *A. elegans* is not at all nearly related, as Kurz suggests, to *A. stipulata*, but that its true affinity is with *A. pedicellata* Bak.

3b. *ALBIZZIA LEBBEKOIDES* Benth. Hook. Lond. Journ. Bot. iii. 89; leaflets 50–60 sessile obtuse very oblique, heads copiously panicled, calyx sessile minute campanulate, corolla-tube much narrower and leaflets much smaller than in *A. odoratissima*. Miq. Flor. Ind. Bat. i. 23. *Acacia lebbekoides* DC. Prodr. ii. 467.

BURMA; very common. DISTRIB. Siam (*Teysmann*); Java.

A medium-sized tree, 30–50 feet high. Leaf-rachis glabrous or pubescent, with a gland far above the base and 2 or more between bases of distal pinnæ; pinnæ 8–12; leaflets obliquely oblong, articulated on the rachis, coriaceous shining dark-green above, paler, not glaucous beneath, '35 in. long, '15 in. wide, the midrib parallel with the upper edge and shortly removed from it. Heads small few-flowered very numerous, arranged as in *A. odoratissima*. Calyx as in *A. odoratissima*. Corolla very narrowly tubular. Pod firm flexible smooth glossy, 6–8 in. long, 1 in. wide, 8–12-seeded.

This is certainly, as Mr. Baker points out, very nearly related to *A. odoratissima* but is quite distinct by reason of its more numerous small leaflets and its narrower corolla. The name is most unfortunate, for the species bears very little resemblance to *A. Lebbek*. Though quite common in Burma, Mr. Kurz did not collect it there, and the species mentioned under that name on Kurz' authority in *F. B. I.* ii. 299 is the tree afterwards published as *A. elegans* Kurz.

4. *ALBIZZIA PROCERA* Benth.

VAR. *elata* Bak. is not separable as a variety. It is distinguished by having smaller leaflets less oblique at the base than in the type. Leaves with leaflets of this shape are common in *A. procera* but they are not smaller than in typical *A. procera*. It is true that in Roxburgh's original coloured drawing of "*Mimosa elata*" the leaflets are shown small, but then Roxburgh has himself written on this drawing:—" *Mimosa elata* considerably less than natural size." A more serious objection to the recognition of a var. *elata*, as apart from *A. procera*, is the fact that leaves with leaflets of both kinds, and consequently that both "varieties," may be collected from different parts of the same tree.

The chief necessity for pointing out the non-existence of var. *elata* is the fact that, from omitting to attend to Roxburgh's MSS. note on the drawing, Mr. Kurz and others have taken *A. Millettii* to be Roxburgh's *Mimosa elata*. The spurred pulvinus of *A. Millettii*, however, at once separates it from Roxburgh's plant.

5b. *ALBIZZIA GAMBLEI* Prain; leaflets of distal pinnæ 10–14 sub-acute or acute, heads panicled, calyx campanulate, shortly pedicelled, *A. Lebbek Gamble, Trees, Shrubs, etc., of Darjeeling Dist., 33 not of Benth.* *A. procera* C. B. Clarke, Journ. Linn. Soc. xxv. 18 not of Benth.

EASTERN HIMALAYA; Sikkim, Gamble 161! 7486! 9661! NAGA HILLS; Kohima, C. B. Clarke 41480!

A tree 50 feet high. Leaves 2-pinnate; pinnæ 4–6 with a large gland '25 in. above base of main-rachis and with large projecting glands on each secondary rachis at the bases of the distal pairs of leaflets; leaflets ovate-lanceolate 10–14 on the distal,

6-8 on the proximal pinnae, in all cases decreasing downwards, apex acute, base cuneate from the middle, '75-2'25 in. long, '4-1 in. wide, pale-green above, glaucescent beneath, sparsely adpressed-puberulous on both surfaces; stipules minute. Ultimate branches of *panicle* umbellate. *Calyx* '1 in. long, puberulous externally, teeth minute, pedicels '05 in. *Corolla* twice the calyx, teeth lanceolate. *Pod* 6-8 in. long, 1-1'25 in. wide, thin, rather firm, strap-shaped, the base narrow-cuneate, the tip blunt; pale straw-coloured, very faintly reticulate; seeds 8-10.

This extremely distinct species bears no very close affinity to either of the species to which it has been referred. It agrees with *A. Lebbek* for which Mr. Gamble has taken it, in colour of pod and in having pedicelled flowers, but its leaves and leaflets are totally different. With *A. procera*, to which Mr. Clarke has referred it, it agrees in having the secondary rachises glandular as well as the main-rachis but the leaflets are quite different in shape and in colour, while its flowers and its pods in no way resemble those of *A. procera*.

The nearest Indian ally of the species is *A. lucida* from which, however, it differs markedly in size of leaves and leaflets and in having shortly pedicelled florets. Its nearest ally in the genus is *A. tomentella* Miq. (*Flor. Ind. Bat.* i. 20) which has leaflets similar in shape, size and disposition, but which differs in having the leaflets densely pubescent beneath and not glaucescent, in having several glands (instead of one only) on the secondary rachises, and in having a broader, brown pod with a very different reticulation.

6. *ALBIZZIA GLOMERIFLORA* Kurz.

This species must be deleted. When Mr. Kurz published it as an *Albizzia* he was treating *Pithecolobium*, to which the tree really belongs, as a section of *Albizzia*. The true name of the species is *Pithecolobium glomeriflorum* Kurz (*For. Flor. Brit. Burm.* i. 430).

7. *ALBIZZIA JULIBRISSIN* Durazz.

This species must also be deleted. There has always been some doubt as to the occurrence of this tree in India. In the *Flora of British India* two varieties are indicated, *viz.*, typical *Julibrissin* said to extend from Hazara to Sikkim and *VAR. mollis* (*Acacia mollis* Wall.; *Albizzia mollis* Boiv.) extending from Simla to Nepal.

There seems, however, to be no such thing as *A. Julibrissin* in India, in a wild state, and the writer doubts if it be even cultivated. Certainly no one has ever sent specimens of *A. Julibrissin* to Calcutta; all the specimens received with this name prove on examination to be either *A. mollis* or, much more frequently, misidentified *A. stipulata*.

(7.) *ALBIZZIA MOLLIS* Boiv. *Encyc.* xix. *Siècle* ii. 33. *A. Julibrissin* *VAR. mollis* Benth.; *Bak.* in *Flor. Brit. Ind.* ii. 300.

This is quite entitled to specific rank. Add to localities:—

ASSAM; *Simons*! MANIPUR; *Watt*!

Though recurring again to the east of the Brahmaputra without having been reported from anywhere between Nepal and the Assam Range, the tree shows no more tendency to resemble specimens of *A. Julibrissin* from China and Japan than does the North-West Himalayan form to resemble specimens of *A. Julibrissin* from the Oriental region.

8. *ALBIZZIA STIPULATA* Boiv.

Add to localities of *F. B. I.*:—

ANDAMANS; *E. H. Man!* NICOBARS; *Kurz!*

Two varieties may be easily distinguished in the field, viz., *VAR. typica* with large stipules, and *VAR. Smithiana* (*Mimosa Smithiana* Roxb.) with small stipules. They cannot easily be separated in the herbarium as the stipules are somewhat deciduous in both; as they grow the two trees are wonderfully unlike and it would not be a matter for surprise to find that Roxburgh was justified in separating them. The typical *A. stipulata* is well known as the *Sao* in Assam and in Sikkim.

9. *ALBIZZIA MYRIOPHYLLA* Benth.

Add to localities of *F. B. I.*:—

KEDAH; *Curtis!* PENANG; *Curtis!* *Kunstler!* PERAK; *Scortechini!*

This species is perhaps most easily recognised by the pulvinus enlarging into a recurved hook just below the leaf-base; it is always a climber.

Another species which has a similarly enlarged pulvinus is the Chinese *Albizzia Milletii* Bth. the oldest name for which is *Mimosa corniculata* Lour. (*Fl. Cochinchin.* 800). Why it deserves our attention here is because of its having been introduced to India and of its having been long cultivated in gardens under the name "*Acacia Careyana* Hort." Mr. Kurz in a manuscript note in the Calcutta Herbarium, by way of criticism of the *F. B. I.*, has expressed the opinion that *Acacia Careyana* is the true "*Mimosa elata*" of Roxburgh. This is not the case; Roxburgh has left a coloured drawing of his *M. elata* which shows that his tree does not have the pulvinus developed into a spur. Moreover Roxburgh has with his own hand written on the drawing "*Mimosa elata* considerably less than natural size"; consequently, the leaflets of *Acacia Careyana*, which are the size of those in the drawing, are considerably less than those of *Mimosa elata*. As has already been explained under *A. procera*, the writer is not only convinced that Mr. Baker is right in referring *Mimosa elata* to *Albizzia procera*, but is strongly of opinion that there is no variety "*elata*" really distinguishable from *A. procera* proper, the leaflets are not smaller in the variety than in the type and both kinds of leaflets (consequently both "*varieties*") can be collected from the same tree.

A. Milletii has been collected in Tonkin by Balansa (nn. 1283 and 1290, both issued as *A. procera*) and recurs in Borneo whence it has been sent by Haviland, (nn. 57 and 2909).

Mr. Kurz has described in the Society's *Journal* xlv. 2. 299 and again in *For. Flor. Brit. Burm.* i. 428 a Siamese tree under the name *Albizzia Teysmanni*. This has alternate leaflets and has no glands on the rachis and does not bear much resemblance to any *Albizzia*. Most probably it belongs to the suborder *Caesalpinieæ*; his only specimen is in such a condition that Kurz was not justified even in suggesting a genus for it.

131. *PITHECOLOBIUM* MART.

4. *PITHECOLOBIUM BIGEMINUM* Mart. in *Flora* xx. 2. *Beibl.* 115 in obs.

5. *PITHECOLOBIUM AFFINE* Bak.

Add to localities of *F. B. I.*:—BURMA; Hills east of Tonghoo, *Brandis!* PERAK; *Kunstler!* SINGAPORE; *Ridley!* DISTRIB. Borneo.

The pod is given as $\frac{1}{4}$ in. wide in the *F. B. I.* This is probably a misprint for $1\frac{1}{4}$ in. wide which is about the true size; Bentham in originally describing the pod states that it is as large as that of *P. fasciculatum*, which is about $1\frac{1}{4}$ – $1\frac{1}{2}$ in. across.

6. PITHECOLOBIUM CONFERTUM *Benth.*

Add to synonyms of *F. B. I.*:—*Albizzia splendens* *Miq. Flor. Ind. Bat. Suppl.* 280. Add:—DISTRIB. Sumatra (*Teysmann* 4228 !)

Mr. Kurz has already pointed out (*Journ. As. Soc. Beng.* xlv. 2. 129) that the species described by Mr. Bentham as *Pithecolobium confertum* in 1874, had been described by Dr. Miquel as *Albizzia splendens* 14 years before. It is therefore probable that Mr. Bentham never saw Dr. Miquel's plant, the identity of which with *P. confertum* is undoubted. But as Miquel drew up his description from leaf specimens only, it seems neither to be necessary nor just to propose, according to what are said to be the essential rules of bibliography, to rename the species *Pithecolobium splendens*.

6/2. PITHECOLOBIUM NICOBARICUM *Prain, Journ. As. Soc. Beng.* lxvi. 2. 267; branchlets glabrous, pinnæ 2, leaflets 4, rarely 6, leaves with a gland near the middle of main-rachis only, calyx campanulate, pod not lobed. *Albizzia bubalina* (*Pithecolobium bubalinum*) *Kurz, Journ. As. Soc. Beng.* xlv. 2. 129 *not of Benth.* *P. oppositum* *Kurz l. c. not of Miq.*

NICOBARS; Nancowry, *Jelinek*; Kamorta, *Kurz*!

Leaflets papery rather rigid, ovate-lanceolate, glabrous, acute, distal 3-4 by 1-4-1-8 in., proximal 1-2-5 by -5-1-25 in., petiolules distinct -1 in. long. *Heads* racemose. *Calyx* -05 in., pubescent, teeth deltoid. *Corolla* and *filaments* not seen. *Pod* dehiscent along upper suture, 5-6 in. long, -75 in. wide, spirally twisted, valves thickly coriaceous, glabrous, dull purplish-red. *Seeds* 8-10, orbicular-ovate, somewhat compressed, -4 in. long, -5 in. wide, -25 in. thick, testa thin crustaceous, dark-purple, smooth, shining; arillus 0.

The Nicobarese name is "*Kawas*." Mr. Kurz does not seem to have seen a specimen of *P. bubalinum* when he referred this tree to that species, or when he referred to that species *P. oppositum* *Miq.* This is at once distinguished from *P. bubalinum* by its different fruits, and from *P. oppositum* by its leaf-rachises being glabrous not puberulous and by its pinnæ being 1-jugate not 2-jugate.

8. PITHECOLOBIUM MICROCARPUM *Benth.*

Add to localities of *F. B. I.*:—PERAK, very common. SINGAPORE; *T. Anderson*! *Kurz*! *Ridley*! DISTRIB. Sumatra (*fide* Miquel); Borneo.

P. oppositum *Miq.* is very near this. Its leaflets are not distinguishable but it differs in having puberulous petiolules and 2-jugate pinnæ, so that it is to be hoped that it is truly specifically separable. Should it, however, prove to be identical with *P. microcarpum* then Miquel's, though the prior name, surely ought not to be used, since that author described leaf-specimens only.

9. PITHECOLOBIUM ELLIPTICUM *Hassk. Retzia*, i. 225. *Inga elliptica* *Bl. Cat. Buitenz.* 88. *Albizzia fasciculata* *Kurz, Journ. As. Soc. Beng.* xlv. 2. 129, *excl. syn.* *Pithecolobium macrophyllum* *T. & B.*

It is not absolutely certain that *P. fasciculatum* Benth. is the same as *P. ellipticum* Hassk., though it is probable that the two are one species. If this be so, however, it is preferable, even then, to use Hasskarl's name, because Benthham's description does not so well accord with the characters of the plant and because Hasskarl's name has the advantage of preserving the oldest specific epithet.

By a *lapsus calami* the *Index Kewensis* gives *Inga elliptica* Bl. as the name, and *Pithecolobium ellipticum* Hassk. as a synonym for this species; the reverse is the actual state of affairs.

Mr. Kurz identifies with this a species issued from Buitenzorg as *Pithecolobium macrophyllum* Teysm. & Binnend., of which Kurz's notice appears to be the earliest mention. The identification proposed cannot, however, be sustained; though the leaves of *P. macrophyllum* resemble those of *P. fasciculatum*, the pods are altogether different and are deeply lobed as in *P. lobatum*. As Mr. Kurz's mention dates from 1876 and as an American *P. macrophyllum* Spruce, was published in 1875, it is necessary to rename Teysmann's plant *P. Teysmanni*.

10. PITHECOLOBIUM LOBATUM Benth.

Add to synonyms of *F. B. I.*:—*Inga Jiringa* Jack, *Mal. Miscell.*
ii. 7. 78. *Acacia Kaeringa* Royle, *Ill. Him. Pl.* 183. *Mimosa Djiringa* Roxb. *Hort. Beng.* 93.

Add to localities:—PENANG; common. PERAK; common. SINGAPORE; *Kunstler!* *Hullett!*

It is not quite clear that *Mimosa Kaeringa* Roxb. and *M. Djiringa* Roxb. are the same. Roxburgh describes the former as having seeds enveloped in an edible pulp; Jack says the latter has seeds without arillus; Koorders and Valetton say the seeds themselves are eaten.

10/2. PITHECOLOBIUM GLOMERIFLORUM Kurz, *For. Flor. Brit. Burm.*
i. 430. *Albizzia glomeriflora* Kurz ex Bak. in *Flor. Brit. Ind.* ii. 300.

Being a *Pithecolobium* and not an *Albizzia* this species must be transferred to the present position.

10/3. PITHECOLOBIUM KUNSTLERI Prain, *Journ. As. Soc. Beng.* lxvi.
2. 271; branchlets slightly pubescent, pinnæ 2-4, leaflets 6, leaves with glands on the rachis below the bases of pinnæ and leaflets, calyx tubular, pod not lobed.

PERAK; *Kunstler!* *Scortechini!* JOHORE; *Lake & Kelsall!* DISTRIB. Borneo.

A low spreading tree with stem 8-12 in. thick; bark brown. *Leaflets* paleish-green, glabrous above, puberulous beneath, ovate with rounded bases and caudate-acuminate tips, distal 3-4.5 in. long, 1-2 in. wide; lowest 1-2 in. long, .5-1 in. wide; rachis of terminal pinnæ 4 in. long, of small basal pair, when present, .5 in. long only. *Heads* 4-8-ld., .5-.75 in. wide, pedicels short puberulous, arranged in lax terminal panicles. *Calyx* with spatulate pubescent bracteole, tubular, densely pubescent, .15 in. long, teeth short triangular. *Corolla* white, .5 in. long, densely silky externally, tube narrowly funnel-shaped, teeth lanceolate .12 in. long. *Pod* with a puberulous stipe .75 in. long, spirally twisted, dehiscent along lower suture, 8-10 in.

long. '6 in. wide; valves thinly coriaceous puberulous, not sinuate between the 8-10 ovate seeds which have long axes parallel with sutures, '7 in. long, '4 in. wide, compressed; testa thin crustaceous.

A very distinct species, nearly related to *P. bigeminum* Mart., but with much larger flowers and with a pod that differs markedly in being long stalked.

ADDENDA.

24. CARAGANA LAMK.

5b. CARAGANA DECORTICANS *Hemsl.* in *Hook. Icon. Plant.* t. 1725.

When arranging the *Caraganas* of the Calcutta Herbarium the writer unfortunately overlooked the fact that his friend Mr. Hemsley had already detected Dr. Aitchison's misidentification of this plant with *C. ambigua* and had published a description and figure of it under the above name, which must therefore replace the name *Caragana Aitchisoni*, used on page 372.

75. PACHYRRHIZUS RICH.

PACHYRRHIZUS ANGULATUS *Rich.*

Professor Oliver has recently given an excellent figure and description of this well-known plant (*Hook. Icon. Plant.* t. 1842). In the same work (t. 1843) is also given a figure and description of the S. American and W. Indian *P. tuberosus* Lamk., which is closely related to *P. angulatus* and is best distinguished by its almost entire leaflets and its larger broader pods. It has recently been introduced to Ceylon; its pods make an excellent vegetable; its seeds are poisonous.

P. tuberosus is related to *P. angulatus* exactly as *Phaseolus Mungo* is to *P. radiatus* and as *Dolichos lignosus* is to *D. Lablab*.

Noviciæ Indicæ XVI. *More additional species of LABIATÆ.*—By D. PRAIN.

[Received May 26th; Read June 2nd, 1897.]

Since the writer presented descriptions of some additional species of this natural order to the Society, six and a half years ago, a few others have come to light that are additions to the Indian flora; descriptions of these, drawn up after the style of the *Flora of British India* are accordingly offered in the hope that they may be of use to members who use that work in the field.

12. POGOSTEMON DESF.

6. POGOSTEMON PARVIFLORUS *Benth.*

Add to localities of *F. B. I.*:—ANDAMANS; common, *King's Collectors*!